Compilation of Notes

ON THE

Most Important Timber Tree Species

OF

The Philippine Islands.

Prepared by

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MANILA, P. I.

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PREFACE.

This compilation of notes was undertaken after numerous inquiries had been made at this office for information concerning the Philippine forests, characteristics of the leading timber tree species, value of same, present and future markets, method of procedure to secure licenses to cut timber, etc. Preliminary investigation by lumbermen will be facilitated by these notes and illustrations, and as the exploitation of these forests will be through American enterprise and capital, the need of a guide to a knowledge of the leading Philippine timber tree species seemed essential. A revision of the Philippine Forest Botany is necessary, and will be made as soon as possible.

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Manila, P. I., January 2, 1901.

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CHAPTER I.

EXTRACT FROM FORESTRY REGULATIONS.

The following extracts from the forestry regulations are of interest to those contemplating the exploitation of the public forest lands of the Philippines.

The Spanish law in force in these islands provided for the reservation of all public forest lands when the proper surveys were made. The practice under said law was to sell the timber at so much a cubic foot. Public timber land was as a rule not sold, but when sold it was done on the approval of the Forestry Bureau and at a valuation by said Bureau.

At present forest products are procured from public lands by license granted for one year by the Forestry Bureau in Manila. No charge is made for this license, but a charge is made as indicated below:

ARTICLE 1. Timber shall be classified into six groups as indicated in the tables below.

ART. 3. The price per cubic foot for the valuation of State timber shall be as indicated in the following table. The price shall be the same in all parts of these Islands:

Superior Group	.....	14	cents	per	cubic	foot.
First "	.....	10	"	"	"	"
Second "	.....	8	"	"	"	"
Third "	.....	3	"	"	"	"
Fourth "	.....	2	"	"	"	"
Fifth "	.....	1	"	"	"	"

ART. 12. The woods of groups 3, 4 and 5 only may be cut for fuel.

ART. 13. Classification of woods as per first article:

1. SUPERIOR GROUP.

NO.	POPULAR NAMES.	SCIENTIFIC NAMES.	NO.	POPULAR NAMES.	SCIENTIFIC NAMES.
1	Calantás.	Cedrela Toona, Roxb.	7	Molave.	Vitex littoralis, Dene.
2	Camagon.	Diospyros discolor, Willd.	8	Narra.	Pterocarpus indicus, Willd.
3	Dungon.	Heritiera silvatica, Vidal.	9	Teca.	Tectona grandis, L.
4	Ebano.	Maba buxifolia, Pers.	10	Tindalo.	Afzelia rhomboidea, Vid.
5	Ipil.	Afzelia bijuga, A. Gray.	11	Yacal.	Hopea plagata, Vidal.
6	Manconó.	Xanthostemon Verdugonianus, Naves.	12	Urung.	Fagræa fragrans, Roxb.

LIST OF TREE SPECIES NOT ON TARIFF LIST. TO BE PLACED IN SUPERIOR GROUP.

NO.	POPULAR NAMES.	SCIENTIFIC NAMES.	NO.	POPULAR NAMES.	SCIENTIFIC NAMES.
1	Barit or Palo de hierro. ?	Metrosideros vera, Rumph.	3	Narra or Magalayao.	Pterocarpus santalinus, Linn.
2	Narra pulá.	Pterocarpus Vidalianus, Rolfe.			

II. FIRST GROUP.

NO.	POPULAR NAMES.	SCIENTIFIC NAMES.	NO.	POPULAR NAMES.	SCIENTIFIC NAMES.
1	Acle.	Pithecolobium Acle, Vidal.	10	Betis.	Azaola Betis, Blanco.
2	Alahan.	Diospyros sp.	11	Camuning.	Murraya exotica, L.
3	Alcanfor.	Cinnamomum camphoratum, Bl.	12	Cubi.	Artocarpus Cumingiana, Trecul.
4	Alintatao.	Chloroxylon Swietenia, DC.	13	Haras.	Garcinia Cowa, Roxb.
5	Anubing.	Artocarpus ovata, Blanco.	14	Lanete.	Wrightia ovata, A. DC.
6	Bansalaguin.	Mimusops parvifolia, Br.	15	Malatapay.	Alangium octopetalum, Blanco. ?
7	Baticuling.	Litsea obtusata, F. Vill.	16	Calamansanay.	Terminalia Calamansanay, Rolfe.
8	Batitinan.	Largerstrœmia Batitinan, Vidal.	17	Tamauyan,	Gymnosporia ambigua, Vid. ?
9	Bayuco, 1st.	Artocarpus nitida, Trec.			

LIST OF TREE SPECIES NOT ON TARIFF LIST. TO BE PLACED IN FIRST GROUP.

NO.	POPULAR NAMES.	SCIENTIFIC NAMES.	NO.	POPULAR NAMES.	SCIENTIFIC NAMES.
1	Agubarao.	Vitex trifolia, Linn. var. obovata, [Benth.	3	Talang gubat.	Diospyros embryopteris, Pers.
2	Dalandon.	Tectona Hamiltoniana, Wall.			

III. SECOND GROUP.

NO.	POPULAR NAMES.	SCIENTIFIC NAMES.	NO.	POPULAR NAMES.	SCIENTIFIC NAMES.
1	Agoho.	Casuarina equisetifolia, Forst.	25	Madre cacao.	Gliricidia maculata, Benth. et Hook.
2	Alalangat or Baguiroro	Adenanthera pavonina, L. ?	26	Malacadios 1st.	Myristica sp.
3	Alpay or Alupag.	Nephelium glabrum, Noronh. ?	27	Malacapon.	?
4	Halopac-amo.	Nephelium Lit-chi, Camb.	28	Malacatmon.	Dillenia Reifferschiedia, Nav.
5	Amuguis 1st.	Odina speciosa, Bl.	29	Malaruhat na pulá.	Eugenia cymosa, Lam.
6	Aranga.	Homalium luzoniense, F. Vill.	30	Mangachapuy.	Vatica Mangachapoi, Blanco.
7	Banaba.	Lagerstrœmia Flos-Reginæ, Retz.	31	Mangasinoro.	Shorea sp. ?
8	Banitan.	Xylopia Blanco, Vid.	32	Mangasirique.	Quercus ovalis, Blanco.
9	Batino.	Alstonia macrophylla, Wall.	33	Marang.	Artocarpus sp.
10	Bayuco 2d.	Artocarpus sp.	34	Mulauin aso.	Premna nauseosa, Blanco.
11	Banuyo.	Albizzia sp.	35	Nangca.	Artocarpus integrifolia, Li.
12	Biloló.	Eugenia sp.	36	Nato.	Sterculia rubiginosa, Vent.
13	Bolong eta.	Diospyros sp.	37	Uayan.	Quercus Blancoi, A. DC.
14	Calimantao.	Evodia sp.	38	Paitan.	Eugenia sp.
15	Calingag.	Cinnamomum Mercadoi, Vidal.	39	Palayen.	Quercus Jordanæ, Lag.
16	Caña fistula.	Cassia Fistula, L.	40	Palo Maria.	Calopyllum inophyllum, Linn.
17	Catmon 1st.	Dillenia philippinensis, Rolfe.	41	Pasac.	Parinarium corimbosum, Miq
18	Dolitan.	Palaquium sp.	42	Pusopuso 1st.	Litsea chinensis, Lam.
19	Dungon-late.	Heritiera littoralis, Dryand	43	Romero.	Podocarpus costalis, Presl. ?
20	Guijo.	Shorea Guiso, Bl.	44	Sirique.	Quercus Vidalii, F. Vill.
21	Guipato.	?	45	Supa.	Sindora Wallichii, Benth.
22	Guisihan.	Ratonia montana, Benth. et Hook.	46	Tanguile.	Shorea Talura, Roxb.
23	Lanutan 1st.	Thespesia campylosiphon, Rolfe.	47	Toob or Tua.	Biscofia javanica, Bl.
24	Macaasin.	Eugenia sp.	48	Tucan-calao.	Sterculia sp.

SECOND GROUP—CONTINUED.

LIST OF TREE SPECIES NOT ON TARIFF LIST. TO BE PLACED IN SECOND GROUP.

No.	POPULAR NAMES.	SCIENTIFIC NAMES.
1	Agho.	Leucæna glauca, Benth.
2	Ampupuyot.	Homalium panayanum, F. Villar.
3	Amuguis 2d.	Odina speciosa, Bl. var. multijuga, [Vid.
4	Bagarilao.	Anthocephalus Cadamba, Miq.
5	Bagarilao na itim.	Nauclea purpurea, Roxb.
6	Balagnan.	Calophyllum Vidalii, F. Vill.
7	Balongcauit.	Cedrela taratara, Blanco.
8	Bancal.	Sarcocephalus cordatus, Miq.
9	Baticulin Marang.	Litsea magnifica, B. et H.
10	Batobato.	Litsea villosa, Bl.
11	Bitanhol 1st.	Calophyllum Wallichianum, Planch [et Triana.
12	Cabiqui.	Mimusops Elengi, L.
13	Cacaná 1st. or Olayan.	Quercus Soleriana, Vidal.
14	Casay.	Pithecolobium montanum, Benth. [var. microphylla, Benth.
15	Cacaná 2d.	Quercus Campanoana, Vid.
16	Catmon 2d.	Dillenia indica, Linn.
17	Ciprès.	Podocarpus cupressina, R. Br.
18	Hindurugo.	Myristica corticosa, Hook. f. et Th.
19	Hoja cruz.	Crescentia alata, H. B. et Knt.
20	Langil 1st.	Albizzia saponaria, Bl.
21	Langil 2d.	Albizzia retusa, Benth.
22	Lanutan 2d.	Saccopetalum longipes, Vidal.
23	Macaasin pulá.	Eugenia leptantha, Wight.
24	Macabingao.	Quercus Llanosii, A. DC.
25	Malarayat 1st.	Gymnosporia montana, Roxb.
26	Malaruhat 2d.	Eugenia operculata, Roxb.
27	Malatumbaga.	Crudia Blancoi, Rolfe.
28	Mamalis.	Pittosporum ferrugineum, Ait.
29	Mambog 1st.	Stephegyne speciosa, Korth.
30	Pahohotan.	Mangifera odorata, Griff.
31	Pahotan.	Mangifera laurina, Bl.
32	Palo Mariang gubat.	Vidalia Navesii, F. Vill.
33	Puso-puso 2d.	Quercus Castellarnauiana, Vidal.
34	Suran-suran	Gordonia luzonica, Vidal.
35	Talang talang.	Myristica bracteata, A. DC.
36	Tacatac, Talacatac and [Lovian 1st.	Castanopsis philippinensis, Vidal.
37	Mambog 2d.	Stephegine parvifolia, Korth.
38	Tubli.	Milletia splendens, W. et A.

IV. THIRD GROUP.

No.	POPULAR NAMES.	SCIENTIFIC NAMES.
1	Abilo.	Garuga floribunda, Dene.
2	Alagao.	Premna vestita, Schauer.
3	Alamag.	Aporosa sp. ?
4	Aclen parang.	Albizzia sp. ?
5	Anagap.	Pithecolobium lobatum, Benth.
6	Ananaplas.	Albizzia procera, B.
7	Anobling 1st.	Talauma angatensis, Vid.
8	Anonang.	Cordia Myxa, F. Vill.
9	Aniatan.	Ochna fascicularis, Blanco.
10	Apitong.	Dipterocarpus grandiflorus, Blanco.
11	Bagarilao.	Nauclea sp.
12	Bagarilao na itim.	Terminalia sp. ?
13	Baguilumboy.	Syzygium sp. ?
14	Bahay.	Ormosia calavensis, Blanco.
15	Balinhasay.	Buchanania florida, Schauer.
16	Balobo.	Diplodiscus paniculatus, Turcz.
17	Balucanag 1st.	Aleurites trisperma, Blanco.
19	Batete.	Wrightia sp. ?
20	Batobato.	Litsea sp.
21	Bayabas.	Psidium Guyava, Linn.
22	Bayoc.	Pterospermum acerifolium, Willd.
23	Bitoc or Bitanhol 2d.	Calophyllum spectabile, Willd.
24	Bunglas.	Zizyphus sp. ?
25	Calumpit.	Terminalia edulis, Blanco.
25	Camanchiles.	Pithecolobium dulce, Benth.
27	Cansuyot.	Antidesma sp. ?
28	Cunalong.	Diospyros Cunalon, A. DC.
29	Cupang.	Parkia Roxburghii, G. Don.
30	Dalindigan.	Shorea sp.
31	Dalinsi.	Terminalia sp.
32	Danglin.	Grewia lævigata, Vahl.
33	Dao.	Dracontomelum sp.
34	Dinglas.	Eugenia bracteata Roxb., var. Roxburghii, Duthie.
35	Ditaa.	Alstonia scholaris, R. Br.
36	Duclap.	Zizyphus trinervis, Poir.
37	Duguan.	Myristica fatua, Hoult.
38	Galagala.	Agathis loranthifolia, Salisb.
39	Gatasan pulá.	Garcinia venulosa, Choisy.
40	Guyonguyon 1st.	Cratoxylon floribundum, F. Vill.
41	Hagadhad.	Dipterocarpus sp.
42	Lauan.	Anisoptera thurifera, Bl.
43	Libato puti.	Cumingtia philippinensis, Vid.
44	Lucban gubat.	Citrus sp.
45	Lumbang.	Aleurites moluccana, Willd.
46	Magarapale.	Terminalia sp.
47	Magarilao.	Nauclea sp.
48	Malaanonang.	Shorea Malaanoñan, Bl.
49	Malabayabas.	Gardenia obscura, Vid.
50	Malacadios 2d.	Myristica sp.
51	Malacmalac.	Palaquium sp. ?
52	Malasaguin puti.	Eugenia sp. ?
53	Mamalis.	Pittosporum Fernandezii, Vid.
54	Manbog.	Stephegyne diversifolia, Hook.
55	Manga.	Mangifera indica, L.
56	Manungal.	Samadera indica, Gærtn.
57	Matabao.	?
58	Mayapis.	Dipterocarpus turbinatus, Gærtn.
59	Pagatpat.	Sonneratia acida, Linn.
60	Pagsainguin.	Canarium villosum, Benth et H.
61	Palosapis.	Shorea floribunda, Kurz.
62	Paho.	Mangifera altissima Blanco.
63	Pili.	Canarium ovatum, Engl.
64	Panao (Balao).	Dipterocarpus vernicifluus, Blanco.
65	Pipi.	Litsea Garciæ, Vidal.
66	Pulanbalat.	Eugenia sp.
67	Quinay-Quinay.	Bridelia sp. ?
68	Sacat.	Terminalia sumatrana, Miq.
69	Saleng.	Pinus insularis, Endl.
70	Sampoloc.	Tamarindus indica, L.
71	Tabigui pulá.	Carapa moluccensis, Lam.
72	Talisay.	Terminalia Catappa, L.
73	Tapulao.	Pinus Merkusii, Jungh. et de Vriese.
74	Taquitaqui.	?
75	Tunbon aso.	Morinda umbellata, L. ?

LIST OF TREE SPECIES NOT ON TARIFF LIST. TO BE PLACED IN THIRD GROUP.

No.	POPULAR NAMES.	SCIENTIFIC NAMES.
1	Aedan.	Cryptocarya densiflora, Bl.
2	Ambabalod.	Nauclea obtusa, Bl.
3	Anli.	Erythrina ovalifolia, Roxb.
4	Anobling 2d.	Talauma Villariana, Rolfe.
5	Apulong.	Osmoxylon pulcherrimum, Vidal.
6	Ansohan.	Stereospermum quadripinnatum,
7	Arahan.	Litsea albayana, Vidal. [F. Vill.
8	Balacat.	Zizyphus xylopyrus, Willd.
9	Balictan ?	Cryptocarya Villarii, Vidal.

LIST OF TREES TO BE PLACED IN THIRD GROUP.

NO.	POPULAR NAMES.	SCIENTIFIC NAMES.	NO.	POPULAR NAMES.	SCIENTIFIC NAMES.
10	Balingua.	Evodia triphylla, DC.	34	Magaspang.	Flüggea obovata, Wall.
11	Balocanac 2d. ?	Chisocheton paniculatus, Hiern.	35	Malabonot.	Sterculia stipularis, R. Br.
12	ganabanalo.	Sterculia decandra, Blanco.	36	Malacalios.	Elæocarpus Monocera, Cav.
13	Banaibanai.	Stereospermum Banaibanai, Rolfe.	37	Malaibohod.	Buchanania florida, var. arborescens, Engl.
14	Banalo 1st.	Thespesia populnea, Corr.	38	Malaguinisan.	Kayea philippinensis, Planch.
15	Banquilin.	Phyllanthus distichus, Muell. Arg.	39	Malatadiang.	Canthium arboreum, Vid.
16	Bignay pogo 1st.	Phæanthus Cumingii, Miq.	40	Malongain.	Melia Candollei, A. Juss.
17	Bitanhol 2d.	Flacourtia Cataphracta, Roxb.	41	Maraligao.	Casearia cinerea, Turcz.
18	Bitungol.	Scolopia crenata, Clos.	42	Palatpat.	Sonneratia sp.
19	Calai.	Monodora myristica, Blanco.	43	Pinca-pincahan	Oroxylum indicum, Vent.
20	Calios.	Streblus asper, Lour.	44	Piras.	Evodia Roxburghiana, Benth.
21	Cubili.	Cubilia Rhumphii, Bl.	45	Ponoan.	Feronia Elephantum, Correa.
22	Camigay.	Cryptocarya ilocana, Vidal.	46	Salincapa.	Vitex pubescens, Vahl.
23	Culilisiao ?	Linociera Cumingiana, Vid.	47	Sayo.	Weinmannia luzonicnsis, Vidal.
24	Dalanta.	Zizyphus dalanta, Blanco.	48	Salab.	Hemigyrosa canescens, Thwaites.
25	Dalonot.	Pipturus asper, Wedd.	49	Salaguin pulá.	Amoora Rohituka, W. et A.
26	Dita-dita.	Astronia pulchra, Vidal.	50	Sauá-sauá.	Scolopia dasyanthera, Benn.
27	Duguan.	Myristica glaucescens, Hook. f. et.	51	Sandaná.	Anisoptera oblonga, Dyer.
28	Himbabao 1st.	Allæanthus luzonicus, F. Vill. [Th.	52	Taglima.	Heptapleurum rigidum, Seem.
29	Himulao.	Clausena Willdenovii, W. et A.	53	Tambon-tambon.	Mallotus ricinoides, Muell. Arg.
30	Lanutan puti.	Goniotalamus giganteus, Hook. f. [et Th.	54	Tigalot.	Elæocarpus multiflorus, F. Vill.
31	Lasgás.	Villaria philippinensis, Rolfe.	55	Tiquis-tiquis 2d.	Cupania pleuropteris ? Blume.
32	Lanutan itim.	Phæanthus nutans, H. f. et T.	56	Tognao-tognao.	Astronia Rolfei, Vid.
33	Locton.	Duabanga moluccana, Bl.	57	Tula-tula.	Mallotus floribundus, Muell. Arg.
			58	Ubian.	Myristica laurina, Bl.

V. FOURTH GROUP.

NO.	POPULAR NAMES.	SCIENTIFIC NAMES.	NO.	POPULAR NAMES.	SCIENTIFIC NAMES.
1	Agos-os.	Ficus pungens, Reinw.	46	Bating.	
2	Agupanga.	Chisocheton sp.	47	Batoan.	Dracontomelum sp.
3	Alauihao.	Dracontomelum sp.	48	Bausio.	
4	Alasas.	Ficus aspera, Blanco. ?	49	Bayac-usa.	Orchipeda sp.
5	Amugan.	Pygeum Maingayi, Hook. ?	50	Bayit.	Jambosa sp. ?
6	Amuyon.	Melodorum fulgens, H. f. et T.	51	Biga.	Zizyphus sp.
7	Anam.	Buchanania florida, var. petiolaris, Engl.	52	Bigas.	
8	Anilao.	Columbia serratifolia, DC.	53	Bignai.	Antidesma Bunius, Spreng.
9	Aroma.	Acacia Farnesiana, Willd.	54	Bignai-pogo 2d.	Antidesma Ghæsembilla, Gærtn.
10	Asactalong.	Phyllanthus sp. ?	55	Bilaun.	Macaranga Mappa, Muell. Arg. ?
11	Asis or Isis.	Ficus heterophylla, L.	56	Bilucao.	Garcinia Cambogia, Desrouss.
12	Ata-ata.		57	Binayuyo.	Antidesma Cumingii, Muell. Arg. ?
13	Bacan.		58	Binting-dalaga.	Micromelum tephrocarpum, Turcz.
14	Bacodong.		59	Binunga.	Macaranga Tanarius, Muell. Arg.
15	Bagaluga.	Melia dubia, Cav. Diss. ?	60	Boc-boc.	Streblus sp.
16	Bagonito.	Cupania sp.	61	Bogo.	Garuga sp.
17	Bagontao.		62	Boto-buti.	
18	Bago-santol.		63	Botong.	Barringtonia speciosa, Forst.
19	Bait.	Canarium sp. ?	64	Bubuy.	Eriodendron anfractuosum, DC.
20	Balacat.	Zizyphus sp.	65	Cabong-cabong.	
21	Balasabis.	Cupania regularis, Blume. ?	66	Cabuyao.	Citrus Hystrix, DC. ?.
22	Balay-bayan.	Pterospermum diversifolium, Bl. ?	67	Cacao-cacauan.	Talauma sp. ?
23	Balay-ohot.		68	Cagatungan.	Pygeum parviflorum, Teysm. et Binn. ?
24	Balibago.	Hibiscus tiliaceus, L.	69	Calay.	Xylopia sp. ?
25	Baligamban.		70	Caliang-tang.	Leea sambucina, Willd.
26	Balinaonao.	Capura pinnata, Blanco.	71	Caloc-catmo.	Vidalia sp. ?
27	Baloc.	Sapindus sp. ?	72	Calumpang.	Sterculia fœtida, L.
28	Baloc baloc	Pongamia glabra, Vent.	73	Cami-oi.	
29	Baluan.	Macaranga sp. ?	74	Canomay.	Diospyros multiflora, Blanco.
30	Balubat.	Anacardium sp. ?	75	Caraol.	Acacia sp.
31	Balucot.	Garcinia sp.	76	Caropsan.	Linociera luzonica, F. Vill. ?
32	Ballan-ballan.	Leea sp. ?	77	Carumanpat.	
33	Banaguling.		78	Caturay.	Sesbania grandiflora, Pers.
34	Banalo 2d.	Cordia subcordata, Lam.	79	Cugao.	
35	Banato.	Mallotus philippinensis, Muell. Arg.	80	Culin-manog.	Canthium mite, Bartl. ?
36	Bancalauan.	Terminalia sp.	81	Culis.	Memecylon edule, Roxb.
37	Bancudo or Nino.	Morinda citrifolia, L.	82	Cuyaquia.	Pometia sp.
38	Bangate.		83	Cuyos-cuyos.	Taxotrophis ilicifolia, Blanco.
39	Bang-got.		84	Daluroy.	Aglaia argentea, Bl. ?
40	Bani.		85	Dangle.	
41	Bantigui.	Pemphis acidula, Forst.	86	Daniri.	Oldenlandia diffusa, Roxb.
42	Barinconcoron.		87	Danloy.	Grewia sp.
43	Barusa.		88	Danyay.	
44	Batang-hisan.		89	Dapdap.	Erythrina indica, Lam.
45	Batican	Dracontomelum sp. ?	90	Dila-dila.	Excœcaria sp.

V. FOURTH GROUP—CONTINUED.

NO.	POPULAR NAMES.	SCIENTIFIC NAMES.
91	Dilang butiqui.	
92	Dondonay.	
93	Duca.	Dittelasma Rarak, Benth. et Hook.
94	Dumpilan.	
95	Himbabao 2d.	Excœcaria Agallocha, Muell. Arg.
96	Hongo.	Elæcarpus sp.
97	Hopong-hopong	
98	Hugud.	
99	Kugno.	
100	Lagasa.	
101	Lagnig.	Clausena sp. ?
102	Lamio.	Dracontomelum mangiferum, Bl.
103	Leptasao.	
104	Libas.	Eugenia sp.
105	Ligan.	
106	Ligas.	Semecarpus Perrottetii, March.
107	Lipote.	Eugenia sp.
108	Lubtob.	Ficus laurifolia, Bl. ?
109	Lunas.	Lunasia amara, Blanco.
110	Lunas-na-itim.	Gonocaryum tarlacense, Vid. ?
111	Llapa.	
112	Maata.	
113	Macaturay.	Stereospermum sp. ?
114	Maga.	
115	Magabagaba.	Arytera rufescens, Radlk. ?
116	Magarambulo.	Cyclostemon sp.
117	Maguilic.	Litsea sp.
118	Malaaduas.	
119	Malabago.	Hibiscus sp.
120	Malabonga.	Iteadapne confusa, Bl.
121	Malabulac.	Bombax malabaricum, DC.
122	Malacacao.	Sterculia sp.
123	Malacamote.	Beddomea luzoniensis, Vidal.
124	Malacauayan.	Hemegyrosa deficienis, Bed. ?
125	Malaciac.	Clethra canescens, Reinw.
126	Malaga-api.	
127	Malaga-itiman.	
128	Malaiba.	Phyllanthus sp. ?
129	Malaicmo.	Celtis philippinensis, Blanco.
130	Malambang.	Mallotus sp.
131	Malang-dalaga.	
132	Malapalitpit or Tiquis-tiquis 1st.?	Sapindus Turczaninowii, Vid.
133	Malapapaya or Bingliu?	Polyscias nodosa, Seem.
134	Malasamat.	
135	Malasambong.	Vernonia arborea, Ham. var. ves.
136	Malasanqui.	Cinnamomum sp. ? [tita, Vid-
137	Malasantol.	Sandoricum sp.
138	Malatagon.	Canarium sp.
139	Malatigui.	Albizzia sp. ?
140	Malatubig.	Syzygium sp. ?
141	Malauban.	Barringtonia sp. ?
142	Manay.	
143	Matan-cuao.	
144	Malibog.	
145	Matobato.	Diospyros sp. ?
146	Matungoc.	
147	Mauayan.	
148	Nanagdong.	
149	Cariquis.	Albizzia Julibrissin, Durazz.
150	Orihnon.	
151	Paihot.	Albizzia sp.
152	Palang.	Acalipha sp. ?
153	Pamalataguen.	Canthium sp.
154	Pandacaqui.	Tabernæmontana coronaria, Br.
155	Paninguinon.	Wormia luzoniensis, Vid.
156	Payaquitan.	
157	Pingol.	Engelhardtia sp.
158	Postalagon.	Gomphia angustifolia, Vahl.
159	Pugauy.	Decaspermum sp. ?
160	Puray.	
161	Putad.	Barringtonia racemosa, Bl
162	Quiniang.	
163	Quio.	Ardisia sp. ?
164	Rubian.	
165	Sagum-sagum.	
166	Salab.	Cupania sp.
167	Salamungay.	Aglaia sp.
168	Salasic.	
169	Salingogon.	
170	Sipit-cait or Supit-caig	Leea javanica, Bl. ?
171	Subian-daga.	Plectronia sp.
172	Subo-Subo.	
173	Sulipa.	Gardenia pseudopsidium, Blanco.
174	Supi.	
175	Surug.	
176	Susuguin.	
177	Tabaldo.	
178	Tabao.	
179	Tabayos.	
180	Tabog.	Ægle decandra, Nav.
181	Tadcan.	
182	Taligauan.	Pterospermum sp.
183	Talio.	
184	Tambis.	Eugenia sp.
185	Tanag.	Kleinhovia Hospita, Linn.
186	Tanglon.	Amoora sp.
187	Taquit-asin.	Mallotus moluccanus, Muell. Arg.
188	Tayocan.	
189	Tigcal.	Aglaia sp. ?
190	Tenaan.	Phyllanthus sp. ?
191	Tenaan-bantay.	Cyclostemon Cumingii, Baill.
192	Tingan.	Rubiaceæ. ?
193	Tinga-tinga.	Pterospermum obliquum, Blanco.
194	Tingcal.	Aglaia sp. ?
195	Tive-tive.	
196	Toquian.	Ternstrœmia Toquian, F. Vill.
197	Tua.	Dolichandrone Rheedii, Seeman.
198	Tulang-manog.	Casearia sp. ?
199	Uban.	Premna sp. ?

LIST OF TREE SPECIES NOT ON TARIFF LIST. TO BE PLACED IN FOURTH GROUP.

NO.	POPULAR NAMES.	SCIENTIFIC NAMES.
1	Amaet.	Xylosma Cumingii, Clos.
2	Balic. ?	Allophylus Cobbe, forma Blancoi.
3	Balitnon.	Melochia arborea, Blanco. [F. Vill.
4	Banilad.	Sterculia urens, Roxb.
5	Binouang.	Octomeles sumatrana, Miq.
6	Balungcauyan.	Pittosporum floribundum, W. et A.
7	Bansilay.	Ochna squarrosa, Linn.
8	Bitlag.	Chailletia geloniοïdes, H. f.
9	Busilac.	Amoora cauarana, Hiern.
10	Cabatiti.	Rhamnus Wightii, W. et A.
11	Cahoi dalaga.	Zollingeria macrocarpa, Kurz.
12	Calomala.	Elæocarpus lanceæfolius, Roxb.
13	Camanguianis.	Clausena excavata, Burm.
14	Camantayo or Guyong-guyong 2d.	Cratoxylon formosum, Dyer.
15	Cayaoyao.	Alstonia spectabilis, Br.
16	Cansilay.	Cratoxylon sumatranum, Bl.
17	Daraya.	Cratoxylon polyanthum, Korth.
18	Hinagdung.	Trema amboinensis, Bl.
19	Malabaguio.	Olax imbricata, Roxb.
20	Malabalubat ?	Semecarpus gigantifolia, Vidal.
21	Malabocboc.	Mesua ferrea, Linn.
22	Malasaguin.	Aglaia palembanica, Miq. ?
23	Matang-arao.	Melicope ternata, Forst.
24	Malarayat 2d.	Alalantia nitida, Oliv.
25	Matang olang.	Salacia prinoïdes, DC.
26	Miagus.	Eugenia sp.
27	Murugna.	Phyllanthus triandrus, Muell. Arg.
28	Polayagan.	Bursera Javanica, Benth.
29	Panguringu.	Cratoxylon Blancoi, Blume.
30	Saladay.	Zanthoxylum oxyphyllum, Edgew.
31	Salaqui.	Chisocheton ceramicus, Miq.
32	Salay.	Zanthoxylum Avicennæ, L.
33	Taglocot.	Ehretia Navesii, Vidal.
34	Taloto.	Sterculia campanulata, Wall.
35	Uatitic.	Colubrina asiatica, L. C. Rich.

VI. FIFTH GROUP.

NO.	POPULAR NAMES.	SCIENTIFIC NAMES.
1	Bacauan lalaqui.	Rhizophora conjugata, L.
2	Bacao. ?	Kandelia Rheedi, W. et Arn.
3	Biuas.	Bruguiera caryophylloides, Bl.
4	Bungalon.	Avicennia officinalis, L.
5	Calibayoan or Baio.	Bruguiera eriopetala, W. et Arn.
6	Culasi.	Lumnitzera racemosa, Willd.
7	Langaray.	Bruguiera parviflora, W. et Arn.
8	Libato-pulá.	Lumnitzera coccinea, W. et Arn.
9	Nilad.	Scyphiphora hidrophyllacea Gærtn
10	Tagasá or Tangal 1st.	Ceriops Roxburghiana, Arn.
11	Tingan-baguis.	Ægiceras majus, Gærtn.
12	Pototan.	Ceriops Candolleana, Roxb. ?
		PALMAS.
13	Anahao.	Livinstona rotundifolia, Mart.
14	Anibong.	Areca Nibung, Mart.
15	Balatbat.	Licuala sp.
16	Balon-luyon.	Corypha sp.
17	Banga.	Calyptrocalix spicatus, Blume.
18	Barangoy.	Orania regalis, Zipp.
19	Bonga.	Areca catechu, L.
20	Canon.	Arenga saccharifera, Lab.
21	Dayaca.	Wallichia tremula, Mart. ?
22	Dumayaca.	Caryota tremula, Blanco.
23	Lumbiac.	Iguanura sp.
24	Luyos.	Areca sp.
25	Macasilad.	Licuala elegans, Mart. ?
26	Palindan.	Bentinckia Renda, Mart.
27	Pinang.	Areca alba Rumph. var. gonocarpa.
28	Pugahan.	Caryota urens, L. [Kunth.
29	Saguisi.	
30	Tamis-san.	Cocos sp.
31	Taquipan.	Caryota Rumphiana, Mart.
32	Tibanglan.	

List of Tree Species Not on Tariff List. To be placed in Fifth Group.—Tangal 2d. Rhizophora candelaria, DC.

LIST OF TREE SPECIES NOT ON TARIFF LIST.

PARTIAL LIST OF TREE SPECIES NOT TO BE FELLED.

NO.	POPULAR NAMES.	SCIENTIFC NAMES.
1	Bagalangit.	Palaquium luzoniense, Vidal.
2	Balete.	Ficus clusioides, Miq.
3	Biri.	Ficus hirta, Vahl.
4	Baliti.	Ficus benjamina, Linn.
5	Bilucao.	Garcinia Cambogia, var. papilla, T. Anderson.
6	Calachuchi.	Plumieria acutifolia, Poir.
7	Gatasan.	Garcinia cornea, L.
8	Ilang-Ilang.	Cananga odorata, Hook f. et Th.
9	Lagnob.	Ficus radiata, Dcne.
10	Champaga.	Michelia champaca, L.
11	Sapote.	Diospyros Ebenaster, Retz.
12	Sulamiog.	Ficus pseudo-palma, Blanco.
13	Talacatac 2d.	Castanopsis sumatrana, A.DC.
14	Taquines.	Ficus radicans, Roxb. var. angulosa.
15	Lumboi or Duhat.	Eugenia Jambolana, Lam. [Miq.

Botanical names of native tree species appropriate for construction, the popular names of which are not known:

Adina philippinensis, Vidal.
Aglaia palembanica, Miq.?
Ailanthus malabarica, DC.
Albizzia Lebbek, Benth.
Allophyllus Cobbe, Bl.
Allophyllus Cobbe, Bl. forma Rheedii, Laws.
Amoora Cumingiana, DC.
Amoora rubiginosa, F. Vill.
Amoora Timorensis, W. et Arn.
Astronia Cumingiana, Vid.
Barringtonia luzonensis, Vidal.
Bauhinia variegata, L.
Beilschmiedia Cairocan, Vidal.
Bruguiera gymnorhiza, Lam.
Buchanania florida, var. lucida, Engl.
Buchanania microphylla, Engl.
Calophyllum Cumingii, Pl. et Tr.
Calophyllum Pseudo-Tacamahaca, Pl. et Tr.
Canarium gracile, Engl.
Carallia integerrima, DC.
Casuarina Rumphiana, Miq.
Casuarina sumatrana, Jungh.
Cassia javanica, L.
Cerbera lactaria, Ham.
Clausena excavata, Burm.
Cleistanthus cupreus, Vidal.
Columbia Blancoi, Rolfe.
Combretum acuminatum, Roxb.
Combretum squamosum, Roxb.
Commersonia platyphylla, Andr.
Cordia Cumingiana, Vidal.
Cratoxylon micradenium, Turcz.
Cynometra acutiflora, L.
Cryptocarya luzoniensis, Vidal.
Cupania glabrata, Kurz.
Dasycoleum philippinum, Turcz.
Desmodium umbellatum, DC.
Diospyros philippinensis, A. DC.
Diplophractum philippinense, Vidal.
Dipterocarpus velutinus, Vidal.
Dracontomelum Cumingianum, Baill.
Dysoxylum Cumingianum, DC.
Dysoxylum Schizochitoides, DC.
Elæocarpus Cumingii, Turcz.
Elæocarpus oblongus, Gærtn.
Eriobotrya philippinensis, Vidal.
Erythrina lithosperma, Bl.
Eugenia cinnamomea, Vid.
Eugenia Cuminiana, Vid.
Eugenia javanica, Lam.
Evodia glabra, Bl.
Evodia latifolia, DC.
Ficus polycarpa, Roxb.
Garcina Andersonii, Hook. f.?
Garcinia Cumingiana, Pierr.
Garcinia Morella, Desv.
Garcinia ovalifolia, Hook.
Gardenia longiflora, Vidal.
Gordonia acuminata, Vidal.
Grewia eriopoda, Turcz.
Grewia multiflora, Juss.
Grewia tiliæfolia, Vahl.
Hemigyrosa Perrottetii, Bl.
Homalium Barandæ, Vid.
Homalium fætidum, Benth.
Homalium Villarianum, Vidal.
Hopea philippinensis, Dyer.
Ixora Cumingiana, Vid.
Kurrimia gracilis, Vidal.
Kurrimia luzonica, Vidal.
Litsea cinnamomea, Bl.
Litsea fulva, F. Vill.
Litsea luzonica, F. Vill.
Litsea Perrottetii, F. Vill.
Litsea verticillata, Vidal.
Lunasia parvifolia, F. Vill.
Mallotus muricatus, Muell. Arg.
Memecylon elegans, Kurz.
Memecylon paniculatum, Jack.
Memecylon Preslianum, Triana.
Melodorum latifolium, Dun.
Micromelum molle, Turcz.
Murraya elongata, A. DC.
Murraya Kœnigii, Spreng.
Myristica ardisiæfolia, A. DC.
Myristica guatteræfolia, A. DC.
Myristica heterophylla, F. Vill.
Myristica paniculata, A. DC.
Nauclea Blancoi, Vid.
Nauclea Cumingiana, Vid.
Nauclea gracilis, Vid.
Orophea enterocarpoidea, Vid.
Palaquim cuneatum, Vid.

BOTANICAL NAMES OF NATIVE TREE SPECIES, ETC.—CONTINUED.

Peltophorum ferrugineum, Benth.
Pittosporum brachysepalum, Turcz.
Premna Cumingiana, Schauer.
Pterospermum niveum, Vidal.
Pygeum arboreum, Endl.
Quercus caraballoana, F. Vill.
Quercus Fernandezii, Vid.
Quercus philippinensis, A. DC.
Rourea santaloïdes, W. et A.
Schleichera trijuga, Willd.
Semecarpus albescens, Kurz.
Serianthes grandiflora, Benth.
Shorea contorta, Vid.
Shorea polita, Vid.
Shorea furfuracea, Miq.
Sideroxylon attenuatum, A. DC.
Sideroxylon ferrugineum, Hook.
Sterculia cuneata, R. Br.
Sterculia ferruginea, R. Br.
Sterculia macrophylla, Vent.?
Sterculia oblongata, R. Br.
Symplocos pseudo-spicata, Vidal.
Symplocos Villarii, Vidal.
Tabernæmontana Pandacaqui, Poir.
Terminalia mollis, Rolfe.
Terminalia pellucida, Presl.
Vatica grandiflora, Dyer.
Vidalia Garciæ, F. Vill.
Vidalia lepidota, F. Vill.
Villaria littoralis, Vid.
Villaria Rolfei, Vid.
Wendlandia luzoniensis, DC.
Wormia suffruticosa, Griff.
Wrightia Candollei, Vid.
Xanthophyllum Griffithii, Hook.

A sufficient amount of timber and firewood is granted gratuitously to needy residents.

The owners of forest or wood land may utilize the products from said lands without government charge by recording a copy of the title to said land in the Forestry Bureau.

CHAPTER II.

STATE FORESTS.

From various sources of information I am led to believe that the public forest lands comprise from one-fourth to possibly one-half of the area of the Philippine Islands, viz: from 20,000,000 to 40,000,000 acres. There are fully 5,000,000 acres of virgin forest owned by the State in the islands of Mindoro and Paragua. The island of Mindanao, with an area of more than 20,000,000 acres, is almost entirely covered with timber, there being but a small percentage of cultivated land. In the province of Cagayan, on the island of Luzon, there are more than 2,000,000 acres of forest. In the places just mentioned the cuttings up to the present date have been very small. In many other provinces in the island of Luzon, especially in the country close to Manila, much timber has been cut; and to fill large contracts the lumbermen are obliged to go quite a distance from this city in order to find a suitable tract. In a recent visit to the southern islands of this group, I was impressed with the amount of timber standing on the smaller islands; frequently the topography was such that it could be exploited with facility. I saw tracts of virgin forest where more than 10,000 cubic feet of magnificent timber per acre was standing: trees 150 feet in height, with trunks clear of branches for eighty feet. There are many millions of cubic feet of timber in these forests that should be cut in order to properly thin out the dense growth: for instance, where there are three or four trees growing on a space required by one, that one so freed would put on more good wood each year than the four together. Forestry is largely a question of light and shade; it is comparatively easy to learn the most desirable tree species for a certain locality, but the question whether 300 or 3,000 trees should remain on one acre is where the real value of the scientific forester is shown.

There are 396 tree species mentioned in the present forestry regulations. We know of fifty more growing in these islands, and from time to time we learn of still other species. It is safe to state that the number of native tree species found will be nearer 500 than 450, a great majority of these undoubtedly being hard woods. The edges of the great forests have been scarcely cut away and fifty valuable hard woods are given to the world, the full value of which species has not been demonstrated as yet. 665 NATIVE TREE SPECIES NOW KNOWN

There are a great variety of valuable gum, rubber and gutta-percha trees, but the trade has been ruined by the Chinese in their efforts at adulteration and other fraudulent practices.

We have a list of seventeen dye woods, the revenue from which, if properly exploited, should pay the cost of the forestry service.

A book has been written by Tavera on the medicinal qualities of the native plants, many trees being mentioned as possessing valuable qualities.

The ylang-ylang tree abounds here, its blossoms producing an oil which is the base of many renowned perfumes. Quite a revenue is gained by owners of these trees.

The west slope of the island of Romblon is a mass of cocoanut palms from the water's edge to the mountain top, every tree bringing in a yearly revenue of from one to two dollars, and, when it is realized that several hundred such trees may be grown on an acre, one is struck with the wisdom of that former commander at Romblon who insisted upon such extensive planting of this species. In all parts of the southern islands these trees seem to grow without any effort or care.

Southern Paragua and Mindanao are celebrated for the great variety of gum, rubber and gutta-percha trees grown there, but these forests have never been properly exploited, and afford a very attractive field for the investigator.

The following commercial uses of the above-mentioned tree species over such an extensive area give some idea of the great forest wealth of the Philippine Islands. Other uses will undoubtedly be discovered as investigation continues.

These forests produce:

Timber and firewood;
Resin, gums and gutta-percha;
Textiles from seed, bark and trunk fibers;
Oils, including perfume essence, etc.;
Dyes;
Bark for tanning;
Sugar and fermented beverages;
Medicines;
Fruit and other food.

It will be the aim of this Bureau to collect all data of interest connected with our forests. Specimens of woods will be added to those now on hand, and their uses and beauty shown as far as practicable. Investigators will be assisted and encouraged by this Bureau to explore and report upon different features of the forest wealth of the islands.

MEANS OF COMMUNICATION.

There are no forest roads or river driveways in the islands that are worth mentioning. It will be impossible to exploit these forests until roads are constructed, rivers improved and harbors provided. The methods at present are exceedingly slow and expensive. The tree is felled far from any road, is hauled out very slowly by one or more carabaos, many tracts being left untouched, due to the difficulty of the haul and the lack of roads. The natives are not skilled lumbermen, and, while paid but a small wage, are by no means cheap labor when we consider the cost of felling and hauling a cubic foot of timber to the shipping point.

The most interesting statistics from foreign forestry reports are those published in Germany, showing the increase in the value of forest lands as the character of the roads improves. Good stone roads have made the German forest lands worth to-day, on an average, $181 (gold) per acre, and these same lands with standing timber less in quantity and quality than we find at present on many large areas in these islands. There will be some difficulty in the construction of roads in such places as Cagayan, Mindoro and Paragua, but these difficulties can be overcome. Stone is plentiful and available, but labor is scarce, and such as we have is poor and uncertain. This latter will be the one great difficulty. When the labor problem is solved, engineers and money will build roads that will make the Philippine forests yield a revenue that is undreamed of to-day by the residents of these islands.

Lumbermen contemplating extensive operations, after solving the labor problem, must next consider the roads and driveways. The main roads should be built by the State with a view to the gradual betterment of the tributary forests. For several years the efforts of the forestry service should be directed to a judicious thinning of the dense jungles where an axe has never been heard, many varieties of undesirable tree species should be cut away and the dense growth thinned out. The State and lumbermen should work together; after the first roads are started the lumbermen can figure on the possibilities of the first forests so tapped. There are no pure forests of any one tree species; dozens of varieties grow in each forest, but there are rarely more than three or four trees of one variety found grouped together, so that any lumbermen looking for a shipload of any one species would find it impossible to cut that and no other, but would be obliged to procure the same by purchase from men operating in different sections. Lumbermen must be willing to take dozens of varieties of tree species.

MARKETS.

There is a great demand in Manila, in fact all through the Orient, for construction timber; the demand will continue, as many important public works are in contemplation in the Philippines, many private enterprises will make demands, thousands of houses must be built, and when the present condition of these islands and the vast amount of work to be done are considered, it would be difficult to foretell when the present high prices for timber will materially lessen. There are very few lumber companies here properly equipped to handle large logs; it will take

companies contemplating such work many months to establish themselves, to secure labor and transportation to deliver their first cargo; and if such companies are not prepared to furnish master mechanics, expert gang bosses, in fact all the skilled labor required, with a full stock of the best supply material, it would be hazardous to attempt to move the large logs which must be cut and brought to market if these forest tracts are exploited properly. It has been the custom by loggers in many parts of these islands to leave the large trees and cut smaller trees so that now in many of the Philippine forests we find only very large trees and very small ones.

LABOR.

Much has been said against the native as a laborer, but as a matter of fact the Filipino and Moro have worked well, and are working well. The native must be treated considerately, he should receive his full wage and not be kept in debt for years, receiving in lieu of pay a few yards of calico and a few pounds of rice at fancy prices. We read much of the heavy losses sustained by advancing wages to native laborers; as a matter of fact the first advance of money is often a charge that should be met by the employer, and if not such a legitimate charge, is soon made up by profits on the necessaries of life sold to the native. In Mindanao, where an American officer has a number of Moros employed, the first wages were paid daily, then by the week. The astonishment of these natives at receiving real money was amusing to the officer; in a very few weeks many of these same workmen, having satisfied their first needs, requested permission and were allowed to deposit their pay with the officer. Such a spirit has been encouraged; it means much to such a community. These people no longer fear the tax gatherer, they can accumulate, become property holders, and then, staunch friends of law and order.

The Chinese coolies work well in the timber, but at present many are not willing to go far from the towns, being afraid of the ladrones and insurrectos. The native has been cutting and hauling timber to the railroad and water's edge recently for about twenty-five to forty cents, Mexican, per cubic foot—that is the price paid to the headman of the native gang. The logs are hauled out by carabaos, usually on mud sleds; recently sixteen carabaos were hitched to one very heavy log which they hauled into a station on the railroad. The carabao is not very strong and succumbs quickly if worked hard. He is useful in the rice field and in swampy ground, but will not meet the demands of the American lumberman. Good roads, mules, portable railways, donkey engines, etc., with intelligent supervision, will go far towards making this vast timber wealth available.

The American lumberman can do it, but not until he has carefully investigated the conditions and is prepared to meet them. There are obstacles here which will paralyze the efforts of companies not fully prepared. This investigation and preparation will take time and should be made by practical men. A good price is paid at Hongkong for timber from the Philippines and Borneo and every stick of timber is eagerly bought up as soon as a vessel arrives. Although the prices in Manila are very high, not much Borneo timber is received here.

PRICES.

High prices have prevailed in Manila ever since the American occupation, due to the scarcity of supply and to the great demand for timber by Quartermasters, Engineers, and Signal Corps, as well as by private parties.

As a rule timber is bought and sold by the cubic foot, occasionally the metric system is used; the loggers very often sell by the vara (33 English inches), that is, a log squaring twelve inches will sell at so much a vara in length, one ten by twelve or twelve by fourteen inches at so much a vara, etc.

In 1875 the prices for timber in Manila ranged from twenty-five cents per cubic foot for Bancal, Lanutan, Paitan and many other species, to fifty cents and less for Molave, Narra, Ipil, Dungon, Mangachupuy, Acle, Tindalo, Yacal, Baticulin, Calantas and others. In 1897 the price in Manila for woods of the first and superior groups ranged from $1.00 to $1.50 per cubic foot; the second group, sixty-five cents to $1.00; third group, fifty cents to seventy-five cents; fourth group, thirty cents to fifty cents.

Since American occupation the prices for logs have been as follows: Superior group, $1.50 to $3.00 per cubic foot; first and second groups, $1.00 to $1.50 per cubic foot; third group, sixty cents to $1.50 per cubic foot.

Very few woods can be bought in this market for less than $1.00 per cubic foot; the retail lumberman sells small lots of some species of the superior group as high as $4.50 per cubic foot.

Contracts have just been let for piles (first group timber), thirty to fifty feet in length, at $11.50 to $12.00 per pile. Telegraph poles cost $1.50 to $2.00 a piece, delivered at the railroad. All prices mentioned are in Mexican money.

At present, freight rates are very high and will probably remain so for a long time, as the increase of trade which will follow cessation of hostilities will be very rapid, making the question of transportation a very difficult one.

CHAPTER III.

LIST OF WOODS DESCRIBED.

Acle
Camphor
Alintatao
Anagap
Anubing
Apitong
Aranga
Amuguis
Banaba
Bancal
Bansalaguin
Baticulin
Batino
Batitinan
Bayuco
Betis
Bitoc
Calantas
Calamansanay
Calumpit
Camagon
Camuning
Dinglas
Ditaa
Dungon
Dungon-Late
Ebony
Guijo
Haras
Ipil
Lanete
Lanutan
Lauan
Macaasin
Malaruhat
Malatapay
Mancono
Mangachapuy
Mangasirique
Molave
Narra
Palo-Maria
Panao-Balao
Supa
Tindalo
Tamauyan
Tanguile
Teca
Urung
Yacal

ACLE.

Pithecolobium Acle, Vidal.
Mimosa Acle, Blanco.
Leguminosæ.

WHERE FOUND—Islands of Luzon, Mindoro, Masbate.

DESCRIPTION—*First Group.*

"First Order:

Color.—Mild dark red.

Odor.—Not perceptible.

Texture.—Solid, fibers undulating, pores not well defined; breaks in long splinters, and gives a shaving rough and little curled. It is plentiful in many parts of the Archipelago. It is used in the construction of houses and vessels. The brilliant black charcoal made from it is said to be excellent.

Elasticity.—0.004 m., the fibers lengthening on the suspension of a weight of 5.751 kilograms; breaks with a weight of 40.594 kilos; weight in the air 9.29 grams per cubic inch, specific gravity 0.709. The above is the mean result of six tests with specimens from different provinces. S. Vidal."

"Gives logs up to thirty-two feet by twenty-eight inches square. It is strong, tenacious and durable, whilst it has the speciality of being difficult to burn and is much used in house building; it polishes well, and is much prized by the natives. It is supposed to be identical with the Payengadu of Burmah. Foreman."

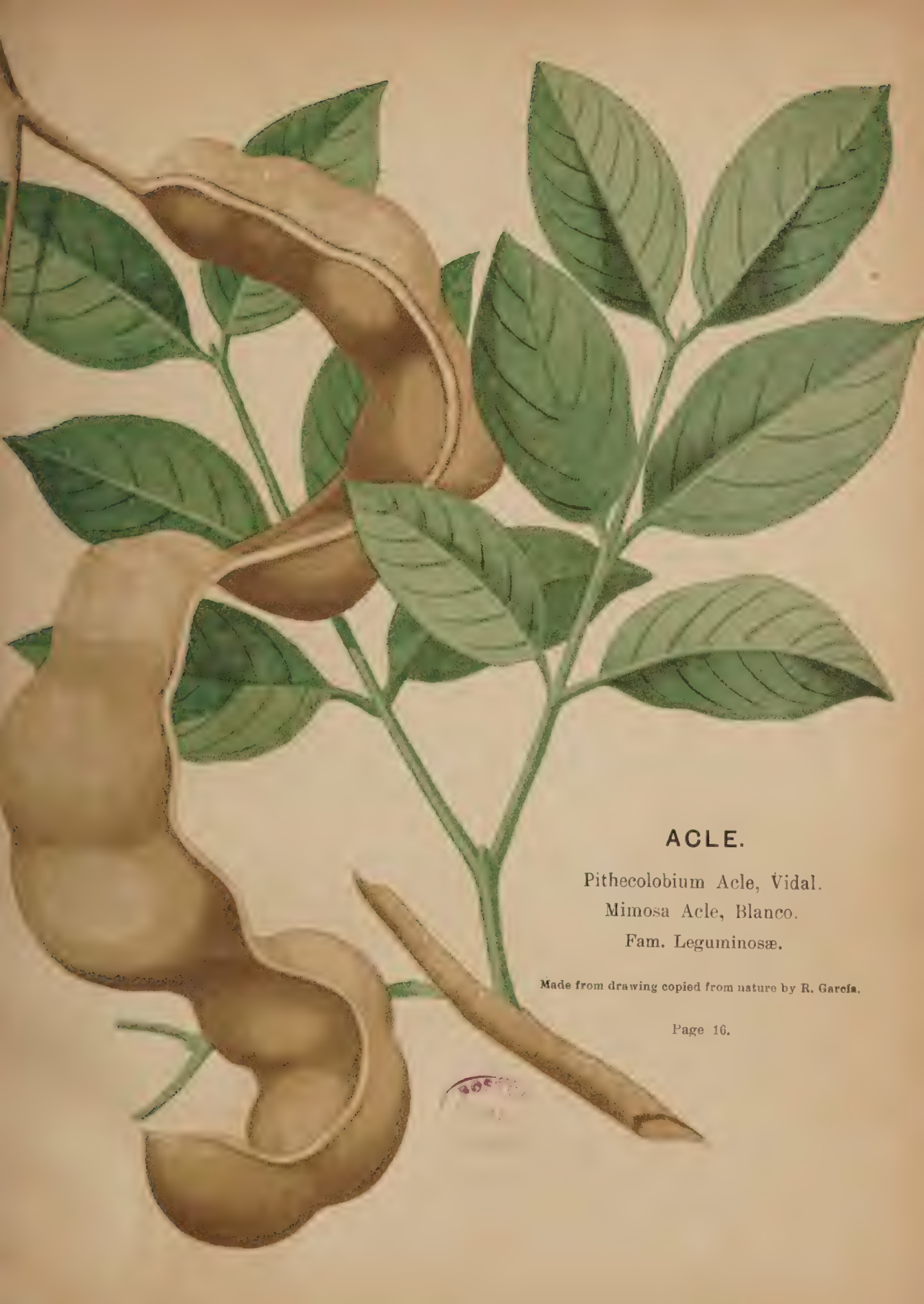
"Although I have not seen this wood in the Visayas, yet it is found in the forests of San Mateo, near Manila, where it is well known. It can scarcely be distinguished from cedar, although it is somewhat darker in color, very noble and excellent; but it is necessary to shield it from dampness in order to preserve it for any length of time.

Nevertheless the natives use it for uprights, in the construction of their houses, where it lasts for many years; the part buried in the ground also lasts well. As it is very light, it is used in the manufacture of chairs, tables, frames, desks and many other similar articles.

When I was minister of the town of San Mateo, I had some columns turned for the altar of the church at that place and the dust of the wood thrown off by turning, caused the carpenter and all who came near enough, to sneeze; it has no special medicinal virtue. P. Delgado."

"Tree of the First Order.

Wood is of a dark reddish color; solid texture; grain in undulating lines; pores not very distinctly marked; breaks into short splinters, the shavings are rough and very little twisted.



ACLE.

Pithecolobium Acle, Vidal.

Mimosa Acle, Blanco.

Fam. Leguminosæ.

Made from drawing copied from nature by R. García.

Page 16.

This wood has the virtue of being nearly incombustible, which property recommends it strongly for all classes of construction, especially naval.

It is used in the construction of buildings and ships, taking the place of the Molave and Ipil, in places where these species are scarce, and compares with them favorably in strength and durability.

The brilliant black charcoal made from this wood is excellent. This timber, owing to its large size and the facility for rafting it, is in great demand in Malabon for the construction of cascos.

It grows principally in the provinces of Bulacan, Tayabas, Laguna, Nueva Ecija and many others.

Señor Cortes made the following tests:

ORIGIN	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS	ORIGIN	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS
Cavite	2.5	1.120	159.5	0.615	Tayabas	1.3	1.440	194	0.738
Bataan	2	1.584	220.5	0.836	Nueva Ecija	2.7	1.632	209	0.784
Laguna	1.7	1.200	196.5	0.507	Bulacan	1.1	1.472	152.5	0.587

We hereby state that for this and for the successive squares, the elasticity or stretching of the fiber 5.9751 kilograms is taken as the equivalent of one pound. In speaking of the weight in open air and the specific gravity and the maximum of breakage, a cubic inch is referred to. D. VIDAL."

"Usual length twelve to twenty-two feet long, and twelve to twenty-two inches square. Special lengths thirty to thirty-two feet and twenty-eight inches square. Strong, tenacious and durable, it has the speciality of being very difficult to burn and is much used in house building; polishes well. BROWN."

"Leaves opposite, bipinnate without terminal leaflet. Leaflets in two or three pairs only, broad, lanceolate, entire and smooth, with a gland between each pair. Pinnæ, only a single pair, with a gland at their base. Pod woody with the margins bent to one side and the seed-spaces elevated. Seeds oval with their margins attenuated, marked with a prominent line parallel to the margin one-half inch long.

A tree of the first magnitude, without thorns, well known near Manila. Wood excellent, very useful. Bark saponaceous. The Indians use it in the construction of their houses. In working it, it causes one to sneeze. Unlike the mimosæ its leaves are very large, eight to nine inches in length and three in breadth. The seeds are edible when green. BLANCO."

"This species was confounded by Fernandez Villar with the Xylia dolabriformis of Bentham, and is given as a synonym of that species by Miguel in his Flora

India Batavæ. On comparison with specimens at Kew, Vidal found it to be distinct and retained the specific name of Padre Blanco. LIEUT. SAFFORD, U. S. N."

"IS A TREE OF THE FIRST MAGNITUDE.

COLOR.—Various shades of dark red.

ODOR.—Scarcely perceptible.

TEXTURE.—Close, fibers undulating, pores little marked; shaving is rough and little curled; breaks in long splinters.

It abounds in many parts of the Philippine Archipelago; its wood is very much used in ordinary and naval construction. SALVADOR CERON."

CAMPHOR.

Cinnamomum Camphoratum, Bl.
Fam. Laurineæ.

SYNONYMS—Alcanfor, Camphor.

WHERE FOUND—Islands of Mindanao and Paragua.

DESCRIPTION—*First Group.*

"COLOR.—Gray, somewhat reddish when recently cut.

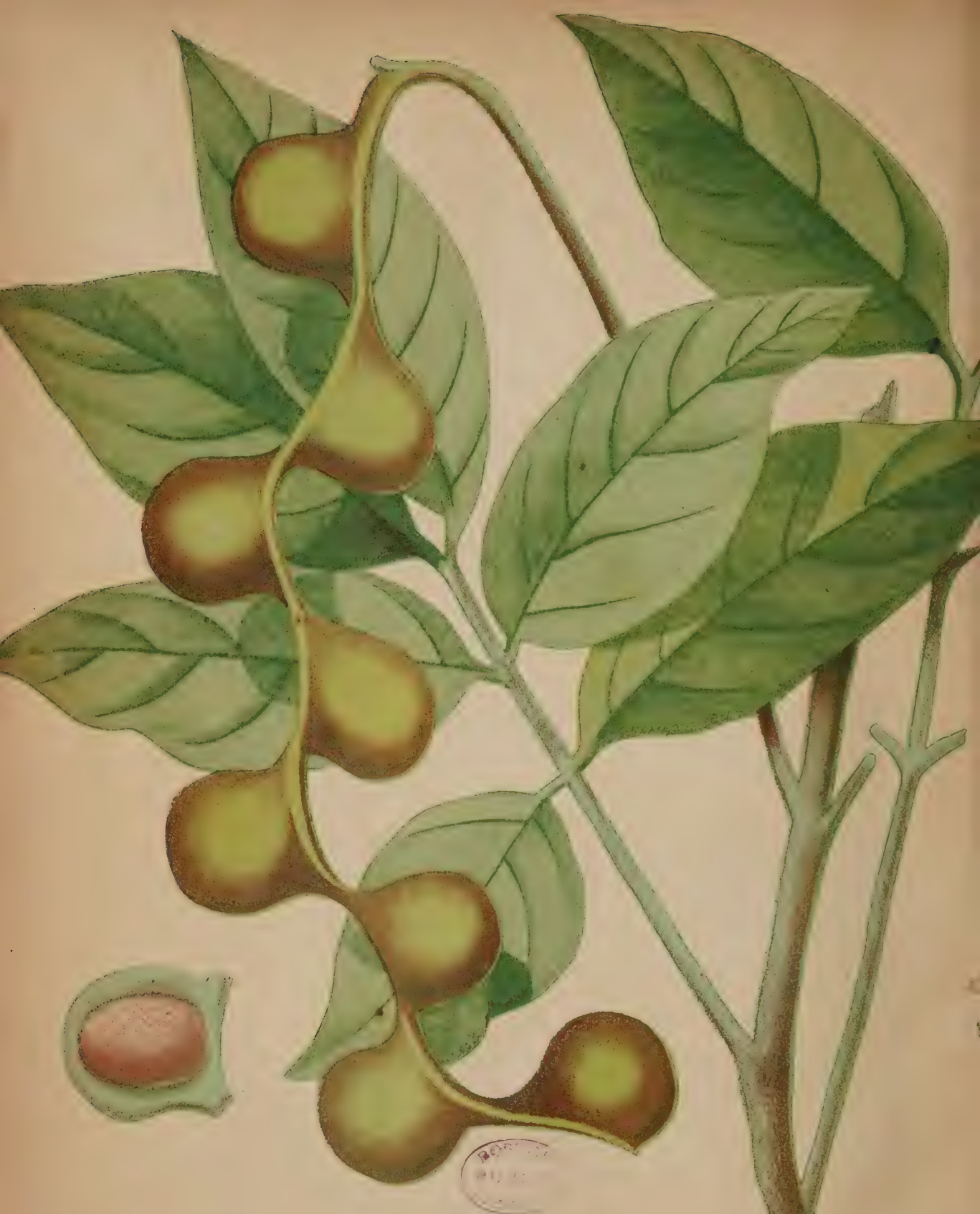
ODOR.—Pleasant.

Found in Mindanao and Paragua, is of medium dimensions; attains a height of from eight to ten meters, and a diameter of thirty-five to forty centimeters (the largest seen). It is used in the manufacture of boxes and furniture, partitions in houses, and doors. The bark can be used as a substitute for cinnamon.

CINNAMOMUN.—In Luzon and Visayas there are other species of the cinnamomun that resemble this, but they are not of the specie Camphoratum.
GARCIA."

"Branches rounded, tender branches close and square in the lower part.

Leaves opposite or alternate, divided in the lower part; base sharp pointed, elliptical or oblong elliptical, commonly long, obtuse point, wide, strong. Color very clear. In growing, the underside has a green color mixed with white. Has three strong fibers, the lateral part without down. Does not last long. Transversal fibers are in the form of a net. Leaves tender and flexible, scattered, without down.
Fruit firmly united to base. MIQUEL."



ANAGAP.

Pithecolobium lobatum, Benth.
Mimosa scutifera, Blanco.
Fam. Leguminosæ.

Atlas, Flora de Filipinas, Blanco, lám. 488.

ALINTATAO.

Chloroxylon Swietenia, DC.
Fam. Meliaceæ.

WHERE FOUND—Islands of Luzon, Panay, Paragua, Samar, Mindanao.

DESCRIPTION—*First Group.*

"Tree of medium size; the largest pieces seen in this market only measured five or six meters long by thirty-five and thirty-eight centimeters square.

Wood is of good quality, texture and fibers fine, medium density. Color is of a reddish yellow. It is used in the manufacture of furniture and for door frames.

There is very little of this in the Manila market. GARCIA."

"They have a wood here that is better than the ebony; it is called Alintatao. It is a wood that is fit best for furniture or for any other purpose you have a mind to use it for; it is a lasting wood. Color dark red with a fine grain. I would recommend Alintatao and Narra as the finest woods for furniture. COLLINS."

Testimony before Peace Commission, May 13, 1899. Twenty-five years in timber business in the Philippines.

"Leaves pinnate, without terminal leaflet, of many pairs of leaflets, sea-green color, and bases very unequal, ovate, subrhomboidal, obtuse, growing in panicles.

Small trees of Oriental India found also in the Philippines in the forests of the jurisdiction of Miagao, Panay. DE CANDOLLE."

ANAGAP.

Pithecolobium lobatum, Benth.
Mimosa scutifera, Blanco.
Fam. Leguminoseæ.

SYNONYMS—Anagap, Casay, Malacamansile, Alobahay, *Tag.*

WHERE FOUND—Island of Luzon.

DESCRIPTION—*Third Group.*

"Leaves bipinnate, without terminal leaflet, in place of which is a spine. Leaflets three pairs, lanceolate, entire and smooth, with a gland between the last pair. Primary petioles have a gland and pit at base. Partial petioles (pinnæ): the small ones alternate, and the upper ones opposite.

Flowers axillary, in panicles; all hermaphrodite. Calyx with five teeth. Corolla twice the length of the calyx, in five lanceolated parts. Stamens and pistils the same as in the Languil. Legume large, very long, twisted in a spiral form, indented transversely almost to the suture, into many divisions, square in form and rounded at the extremities, separate from each other, some inclining one way and

the others alternately. Each division contains a large, thick oval seed, without an elevated line parallel to the margin, and attached to the suture of the opposite section, a long fiber. This tree, known as Anagap in the province of Batangas attains a height of six or more fathoms.

The leaflets are six inches long and three wide and are membranous.

The natives have assured me that it lasts as long in the ground as the Molave and Anubing, and in fact I have seen them use it for posts in their houses.

The bark, judging from what I have seen, has saponaceous qualities equal to the Langil. The fruit has a strange appearance as if formed of many shields, as described above, and for which reason the species is called scutifera.

In the mountains of Banang it flowers in June. I have seen a variety of which the following is a description:

Leaves opposite, tripinnate without the terminal leaflet in place of which is a spine. Leaflets more than sixteen pairs, very small, rhomboid shaped, smooth upper side and somewhat downy underneath, with a gland in the terminal pair.

Cross section of the common petiole five-angled, the wing-like processes extending along it at the angles, with a concave gland towards its base and a similar one at the base of the secondary petioles which are alternate. The secondary petioles (pinnate) are opposite, about ten pairs, with a gland at the base.

Flowers grow in panicles, all are hermaphrodite. Calyx and other parts the same as the Anagap. Legume twisted spirally, as in the Camanchile with many notches which do not extend to the upper suture, with a corresponding number of compartments, each containing a kidney shaped or lenticular seed attached by a long filament to the lower suture of each compartment.

Tagalo: Casay, Malacamancile, Alobahay.

Is a tree whose diameter exceeds the thickness of a man's thigh. Its flowers have the identical appearance of those of the Anagap, the fruit which is red at maturity is somewhat different, being smaller, but otherwise appears to be similar to it.

The smaller leaves are half an inch long. I do not know if the bark has saponaceous qualities; but the natives use it, as well as other species, in order to 'set' the blue color in dyeing fabrics. Flowers in January. BLANCO."

"TREE ATTAINS A HEIGHT OF TWENTY METERS.

COLOR.—Yellowish gray.

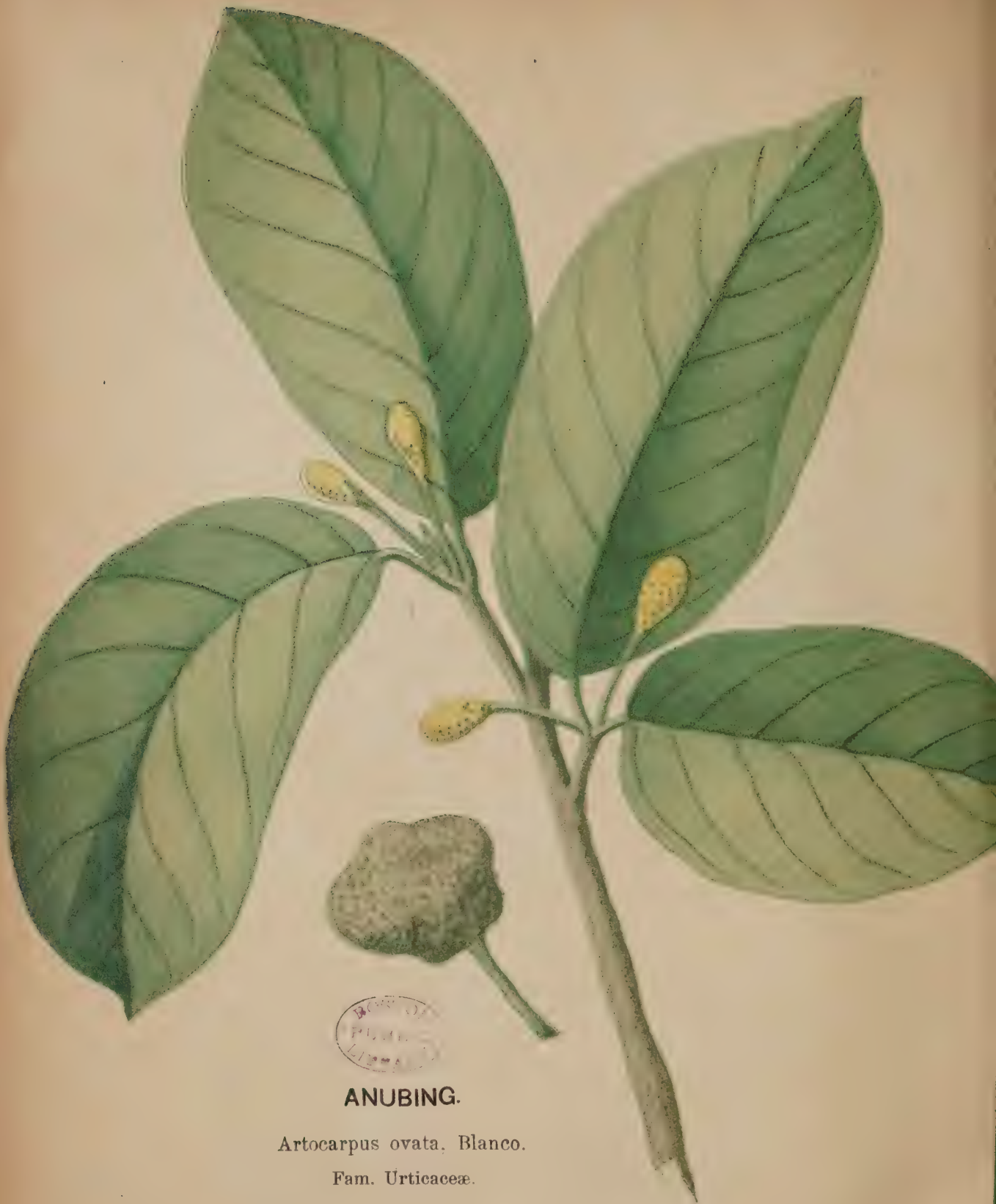
TEXTURE.—Fine, somewhat brittle, breaks in long splinters.

It is used to a limited extent in ordinary construction.

ELASTICITY, 0.006; breaks with a weight of 23.465 kilograms; weight in air, 6.389 grams, and specific gravity, 0.486.

It is frequently found in the province of Bataan, whence came the specimen used in the above test. S. VIDAL."

"Gives logs up to eighteen feet long by sixteen inches square. It is sometimes used for house furniture and fitting and for other purposes where a light durable wood is wanted and not exposed to the sun and rain. FOREMAN."



ANUBING.

Artocarpus ovata. Blanco.

Fam. Urticaceæ.

Copied from nature by R. García.

ANUBING.

Artocarpus ovata, Blanco.
Fam. Urticaceæ.

SYNONYMS—Anubing, Anubin, Anobing, Anobling, Anubiong, *Tag.*
Anobion, *Pamp.*
Anuvion, Bayuco—*Visayas.*

WHERE FOUND—Islands of Luzon, Mindanao, Paragua, Visayas.

DESCRIPTION—*First Group.*

"SECOND ORDER:

COLOR.—Yellowish gray.

ODOR.—Faint and disagreeable.

TEXTURE.—Texture fine, pores small; brittle, breaks in short splinters. It is much used in some provinces for uprights and rafters for houses. Is considered impervious to decay.

It is very scarce at the present time in the market of Manila.

Señor Cortes made the following tests:

ORIGIN	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS	ORIGIN	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS
Bulacan.....	3.8	1.072	143.	0.567	Laguna.....	2.	1.136	168.	0.625
Nueva Ecija.....	1.4	1.720	115.	0.344	Bataan.....	2.	0.896	152.5	0.593

D. VIDAL.

"SECOND ORDER:

COLOR.—Yellowish gray.

TEXTURE.—Fine, pores not well defined; breaks in short splinters. It is plentiful in almost all the islands. The Indians use it very much for posts in building their houses.

ELASTICITY—0.005 m.; breaks with a weight of 25.765 kilograms; weight in the air, 6.99 grams., and specific gravity, 0.593. S. VIDAL."

"Is sure to resist dampness as well as Molave, but is not appreciated as a good hard wood. It is plentiful, especially in the district of Laguna de Bay.

FOREMAN."

"From twenty to thirty feet long, and twelve to sixteen inches square. A good wood for various purposes. When seasoned it is light and very strong; may be used under ground if entirely free from sap wood. BROWN."

"Leaves alternate, somewhat heart-shaped, ovate-oblong and sharp at the point, slightly serrated and both sides covered with hair. Petioles very short. Flowers

monœcious. Male axillary united in the common receptacle in the figure of a mace. Common peduncle very long. Calyx and corolla proper absent. Anthers, a great number, which cover the receptacle entirely. Filaments, none. Female axillary flowers united also, in a common receptacle, almost globular. Peduncle very long and thicker than in the male. Calyx and corolla proper absent. Styles very short and sharp, very numerous, which fill the receptacle entirely. (Probably each flower has a style.) The receptacle of the female resembling an apple with many globular nuts of the size of a filbert, reaching nearly to the edge, covered with two membranes and a fragile nucleus. A great many of these abort. The fruit is somewhat similar to the Nangca except it has no points, and is much smaller; it is only two inches in diameter. BLANCO."

"Is a species which grows in the Philippine Islands and is of the second order.
COLOR.—Yellowish gray.
TEXTURE.—Fine and pores little marked; breaks in short splinters.
The natives use it very much in the construction of their houses.
SALVADOR CERON."

APITON.

Dipterocarpus grandiflorus, Blanco.
Fam. Dipterocarpeæ.

SYNONYMS—Apiton, *Tag.*; Hapiton.

WHERE FOUND—Islands of Leyte, Luzon, Mindanao, Negros, Panay, Paragua, Romblon and Samar.

DESCRIPTION—*Third Group.*

"FIRST ORDER.

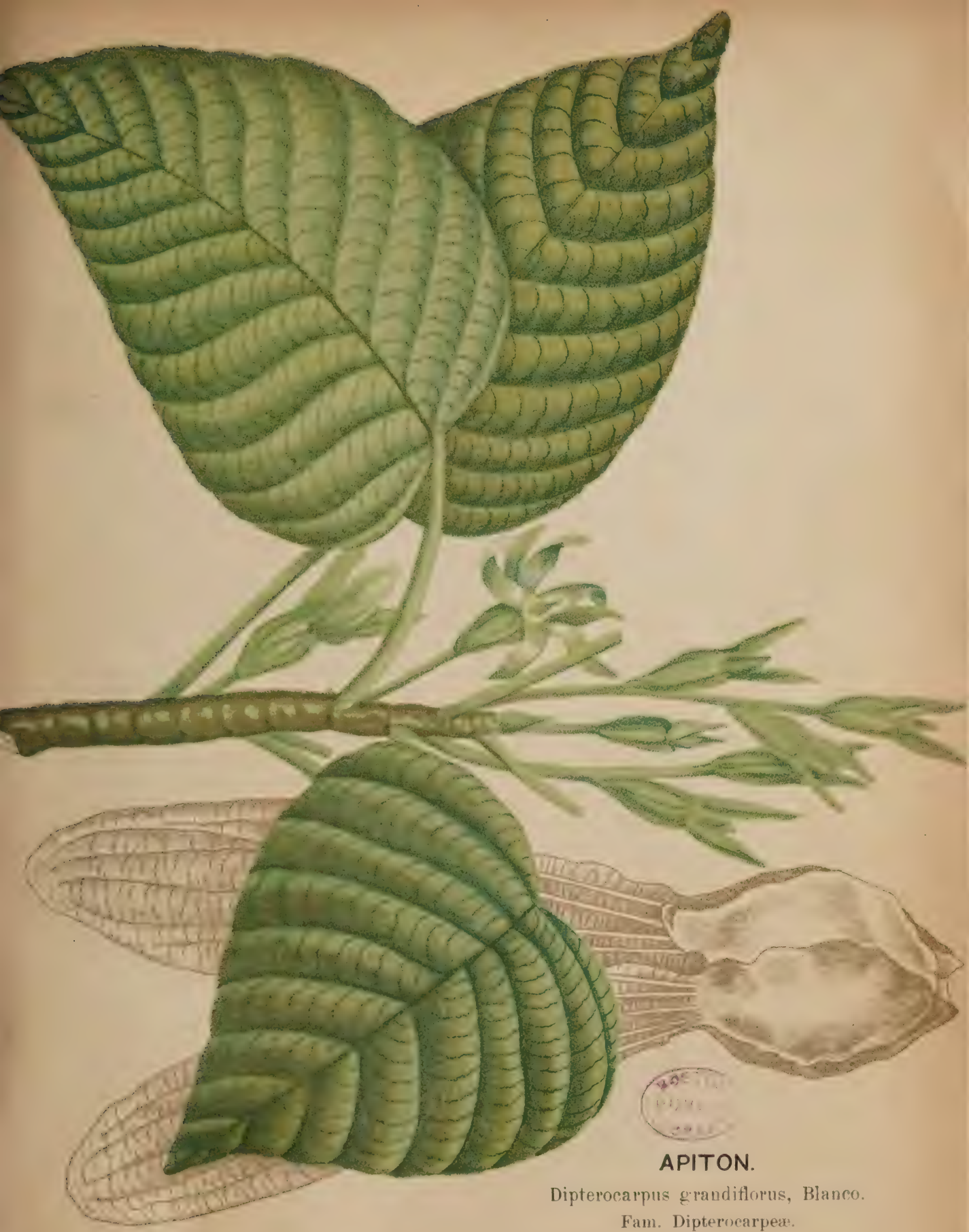
COLOR.—Ashy or grayish green with clearer or white spots.
TEXTURE.—Fine, brittle, breaks in long splinters.
ODOR.—Not perceptible.

An odorous and thick resin, similar to the furniture varnish Malapaho, is distilled from its trunk; the gum of the Apiton, however, cannot be used as a substitute.

It is plentiful in the islands, especially in the southern part of Luzon, Mindoro, Visayas (large quantities have been sent to China from the district of Concepción), Marinduque, etc. It is used in the framework of houses and is also sawed into planks.

It should not be classified higher than the third or fourth order.

Tests made with a specimen from Mindanao gave following result: elasticity 0.005 m.; broke with 21.624 kilograms; weight in air 7.565 grams, and specific gravity 0.615. S. VIDAL."



APITON.

Dipterocarpus grandiflorus, Blanco.

Fam. Dipterocarpeæ.

Atlas, Flora de Filipinas, Blanco. lám. 86.

"TREE OF THE FIRST MAGNITUDE.

It is used in building, as sills, rafters, etc., and also is sawed into planks; it is used in naval construction for building bancas and for the sides and bottoms of ships.

The wood should not be classified higher than the third or fourth group.

Señor Cortes made following tests with specimens from Mindoro: elasticity 2.3; breaks at 0.752 ounces; weight in air 151.5 grains, and specific gravity 0.615.

D. VIDAL."

"Leaves alternate, ovate, acuminate, and slightly obtusely emarginate, smooth. Flowers terminal in a species of raceme of three or four small flowers, and two very large bracts, lanceolated and colored at the base, and each small flower with another similar bract. Calyx inferior, oblong, fleshy, woody, very large at maturity with five wings on the sides and divided to the middle in five very long parts, linear, colored and forming the crown of the mature fruit. Corolla of five petals, small, lanceolated and overlapping each other at the edges. Stamens, nearly thirty, fixed between the petals and the ovary. Filaments, scarcely any. Anthers long, awl-shaped, grooved and without bristles. Ovary conical, situated at the bottom of the calyx, with grooves in the upper part. Style longer than the stamens. Stigma compressed with an umbilicus. Drupe, dry, closely united to the lower part of the calyx, but not adherent, oval, crowned near the end with the parts of the calyx elongated like wings; the two large ones, lanceolate, with three veins and the other intermediate ones smaller; the nut thin and woody, containing one seed with five deep lobes.

This tree is of the first order. It is well known on account of the thick and odorous resin that exudes upon cutting it. It is similar to that sold under the name of Malapaho, which serves as a varnish for wooden furniture and paintings, giving a splendid color effect; but this is not the tree which gives that; the gum from this tree will not produce an equal effect. The wood is whitish and very hard, and is used for making very large canoes and planks for houses. In this species the ovary does not adhere to the calyx. Although I have very often seen the fruit ripe, the calyx was never solidly united but only closely drawn to the fruit, and not adherent as in the Panao. The entire appearance of the tree, its flowers and properties, indicates that without doubt it is congeneric with the others. It is found in the Visayas, Marinduque, Mindoro and in other parts. In this species the anthers have no bristles. The lacinias or wings of the calyx are nearly six inches long. The fruit has the appearance of an egg; the nut is not hard.

It flowers only in March. It is to be carefully observed that in the species which I have named Vernicifluus, Mayapis, polyspermus and grandiflorus, the fruit does not unite with nor does it form a unity with the calyx as in the other congeners; but the calyx continues growing over the fruit, tightly binding it until it is completely enveloped. This circumstance necessitates that two divisions be made of the genus. There are many trees of this genus in these islands, and of great usefulness, but the Tagal Indians do not show the same aptitude in taking

advantage of the riches of the country as do the Visayans. Some are of very large dimensions, others medium. Some pieces last a long time in salt water, others do not. There is also a difference in the resin, which exudes from the tree, being more or less fluid or odorous. The resin, called Batite in Leite, is used, with other ingredients, in Cebu for making the odorous pastils and balls so well known there.

P. BLANCO."

"TREE OF THE FIRST MAGNITUDE.

Is a tall tree with a trunk of fine dimensions.

COLOR.—Ashy, greenish, with clear or white streaks.

ODOR.—Not perceptible.

TEXTURE.—Fine and fibrous and breaks in long splinters. Grows spontaneously in the south of Luzon, Mindoro and the Visayas, Philippine Islands.

In construction it is used in a sawed form and is of medium quality.

SALVADOR CERON."

ARANGA.

Homalium luzoniense, F. Vill.
Samydaceæ.

WHERE FOUND—Islands of Luzon, Mindoro.

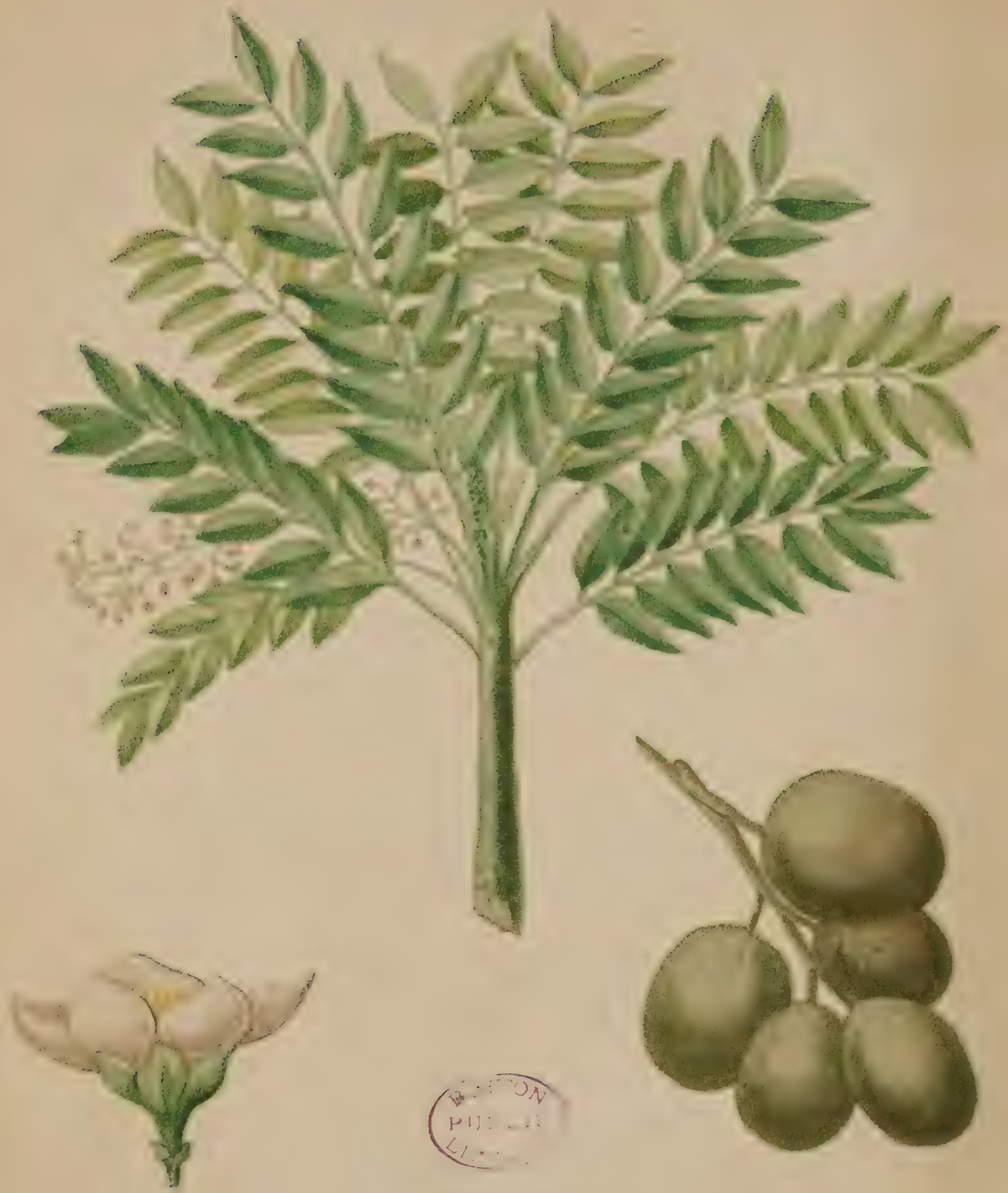
DESCRIPTION—*Second Group.*

"COLOR—Reddish with violet grain.

TEXTURE—Compact, fibers straight; somewhat brittle. It is used in naval construction. It is plentiful in Tayabas. No tests have been made showing its elasticity, resistance, weight in the air and specific gravity. S. VIDAL."

"Gives logs up to seventy-five feet long by twenty-four inches square. It is specially used for sea piling and all kinds of marine work which is subject to attacks of sea worm. FOREMAN."

"Tree full of leaves. Tender branches cylindrical, grayish, full of pits and with clear oblong spots. Leaves alternate, ovate or ovate-elliptical, rounded at base, frequently with thick and obtuse glands in the lower part, also glandular at the apex, which is obtuse and briefly acuminate, festooned, leathery and very smooth; eight to sixteen centimeters long by six to ten wide. Petioles thick, ten to twelve millimeters long. Inflorescence white, downy, growing in spiked panicle, axillary and terminal. Bracts nearly equal, frequently with flowers. Flowers bunched together, scaly and with long peduncles. Calyx top shaped. Petals eight, spatulate, with a ridge along the back. Sepals eight, lineal, twice as long as the petals and sometimes only one-third of their length, glandular opposite, white, downy. Stamens sixteen, cleft in upper part inside the petals, opposite. Styles four, thick.



AMUGUIS.

Odina speciosa, Blume.
Cyrtocarpa quinquestila. Blanco.
Odina multijuga, Vidal.

Fam. Anacardiaceæ.

Atlas, Sinopsis, Flora Forestal de Filipinas, S. Vidal, lâm. XXXVII.

Capsules not described. Specific name taken from Luzon Island, Philippines. It is found in Tayabas and Angat, Luzon. I saw a specimen in Vidal's herbarium. Name in Tagalo is Aranga. F. VILLAR."

AMUGUIS.

Odina speciosa, Blume. (F. Vill., p. 55.)
Cyrtocarpa quinquestila, Blanco. p. 269, 2d ed.
Odina multijuga, Vidal. (Atlas Flora For., Vidal.)
Anacardiaceæ.

SYNONYMS.—Amuguis, Amoguis, *Tagalo*; Sambaluyan, Ambogues, Muguis, *Visayan.*

WHERE FOUND—Islands of Luzon, Mindoro, Paragua, Panay, Masbate.

DESCRIPTION—*Second Group.*

"BELONGS TO THE SECOND ORDER.—Very common and well-known.

COLOR.—Ranges from a very light red to a uniform blood red or with lead colored stains.

TEXTURE.—Solid and fine, although sometimes filaceous. The pores are numerous and of regular size; the medullary rays of the first order, well marked, the second scarcely visible; is inodorous, and in breaking, leaves short splinters. It emits a disagreeable odor upon being cut or fashioned. With the Anosep, it is preferred for nipa construction, being the best species of the group commonly named 'Madera-nombrada' (named woods). It is used as aforesaid, with an ordinary duration of ten years before decomposition sets in, and from that time it will generally last seven years more. Planks made from it are good. It would be of more value if it were free from the attacks of the anay, and it is highly valued in those districts where it is exempt from the attacks of this insect.

It is abundant.

Señor Cortes made the following tests. Señor Cortes made tests upon specimens from the province of Negros, obtaining 2.2 of elasticity, breaks with a weight of 1.050, weight in air 119.5 grains, and specific gravity 0.459.

D. VIDAL."

"COLOR—Clear red or meat red, uniform or with lead-colored spots.

ODOR—Recently worked emits a disagreeable odor.

TEXTURE—Moderately compact; pores numerous and of regular size; medullary rays of first order, well marked, the secondary scarcely visible; breaks in long splinters. Gives fine planks which are used in ordinary and naval construction.

This wood would be very valuable if it were not subject to attacks from the anay.

Elasticity 0.005 m., lengthening of fibers with a weight of 5.751 kilograms, broke with a weight of 23.924 kilograms, weight in the air of 7.414 grams per cubic inch; specific gravity0.538. Mean result from two tests with specimens from two provinces. S. VIDAL."

1-for

"Is a tree well known in the Indias and is of the second order.

Color, dark red. It is very much used in building, and excellent planks are sawed from it; but it is subject to attack from the anay. It is prized in some parts of the Island where it is said it is free from the attacks of that insect. The ripe fruit is of a whitish color and is edible. It flowers in March. BLANCO."

BANABA.

Lagerstrœmia Flos-Reginæ, Retz. app. Fern, p. 91.
Munchausia speciosa—Blanco p. 427, 2d ed.
Lythrarieæ.

SYNONYMS—Bloodwood, *India;* Panagah, *Borneo;* similar leaf and flower.

WHERE FOUND—Islands of Leyte, Luzon, Mindoro, Negros, Panay, Paragua, Romblon, Samar.

DESCRIPTION—*Second Group.*

"There are two varieties, which can be readily distinguished from each other by the color, one red and the other more frequently white. It is a tree of twelve or more meters in height, resists well the action of the weather and is very durable in water. Its color varies from a reddish white to a clear red with white streaks; the fibers are longitudinal and compact, the pores elongated and narrow, appearing at times like small cracks; breaks with short splinters. The shavings are rough, very slightly curled and porous.

The texture of the red species is firm; it is fibrous and smooth. The white is more ordinary and less valued on account of its inferior qualities. It is used ordinarily for sills and flooring; it takes a beautiful gloss after having been rubbed with plantain leaves; it is used in naval construction for finishing upper part of small boats and for interior work.

Care should be taken to use seasoned planks as they shrink as much as one-fifteenth of their width.

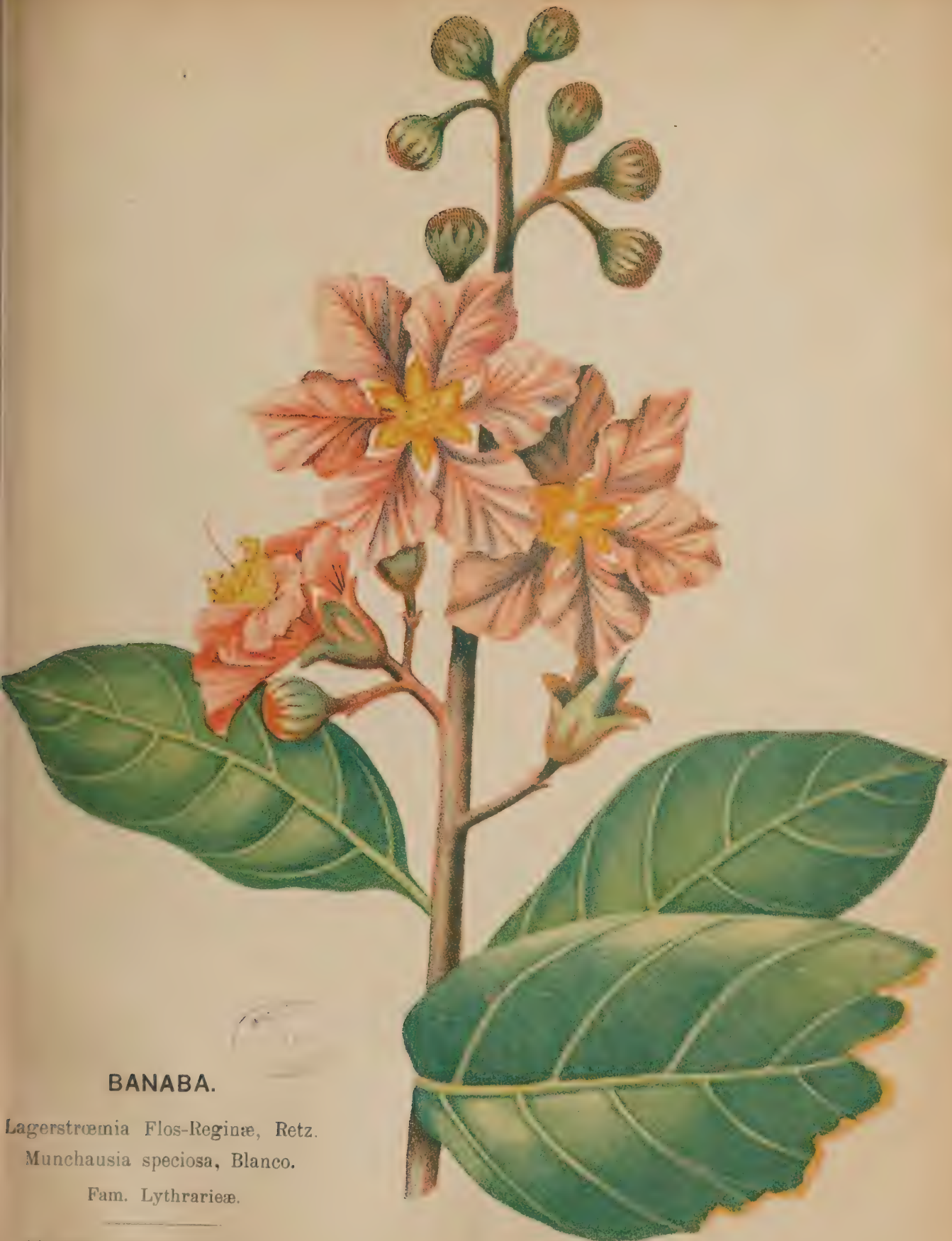
For the last fifty-six years it has been used with the Molave in house construction, Tindalo, however, being utilized for doors.

Señor Cortes made following tests:

ORIGIN	ELASTICITY LINES	BREAK AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS	COLORS	ORIGIN	ELASTICITY LINES	BREAK AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS	COLORS
Cavite	1.9	1.344	184.5	0.668	Red.	Negros	2.8	1.040	195	0.728	Light red.
Pampanga ..	2.3	1.120	209.5	0.807	Light red.	Bulacan.....	2.8	0.872	182	0.738	Light red.
Nueva Ecija	1.5	0.592	201.5	0.984	Light red.	Laguna	1.2	1.360	205	0.803	White.
Mindoro	1.3	1.312	234	0.876	White.	Tayabas.....	1.7	0.528	216	0.796	White.

D. VIDAL."

"There are two varieties, the red and the ordinary white, the *Lagerstræmia speciosa*, Pers. (Fam.—*Lythratiaceas*, Lind, or *Salicarieas*, Juss.). It attains a



BANABA.

Lagerstrœmia Flos-Reginæ, Retz.
Munchausia speciosa, Blanco.

Fam. Lythrarieæ.

Atlas. Flora de Filipinas, Blanco, lám. 2

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height of ten to twelve meters, and sometimes more. It is useful in all kinds of construction, resisting well the climate, and lasts well in water. Its color varies from a reddish white to a bright brown red; the fibers are longitudinal and compressed, the pores elongated and short, having the appearance sometimes of small cracks; breaks in short splinters; the shavings are rough, very little curled, and porous. The white variety is of a coarser texture than the red, and is inferior to it in quality, for which reason the red is preferred in domestic and naval construction. *Banaba colorada:* elasticity 0.004 m., breaks with a weight of 28.957 kilograms; weight in the air, 10,749 grams, and specific gravity, 0.727. The white gave an elongation of 0.0028 m.; broke with a weight of 30.654 kilograms; weight in the air, 10.749 grams, and 0.825 specific gravity.

As there is some uncertainty in distinguishing the two species from each other, and as Señor Cortes in his description of tests very seldom refers to the species, it would be advisable to take a mean of the tests on both and obtain a result for the species, viz.: elasticity 0.0035; breaks with a weight of 29.820 kilograms; weight in the air 10.099 grams; and specific gravity 0.776. S. VIDAL."

"A strong and useful wood much used in house and ship building; it is thoroughly reliable when seasoned, otherwise it warps and shrinks considerably.
FOREMAN."

"Leaves alternate, lanceolated, entire and smooth. Petioles very short. Axillary and terminal flowers in racemes. General and partial involucre, two small, concave leaves. Calyx enclosing the fruit before maturity, large, leathery, bell-shaped, with six horizontal teeth and an equal number of small alternate ones, consistent and with deep grooves. Corolla very large, of six petals, with crinkled margins and clawed at the base, inserted between the divisions of the teeth of the calyx. Large number of stamens fixed in the lower part of the calyx in groups, and very much shorter than the corolla. Style much longer than the stamens. Stigma somewhat thick. Capsule oval, half covered with the calyx, breaking into six or seven parts, with an equal number of small cells, in each one more than four irregular seeds with a wing or a sharp incision on one side.

This tree, with its large and beautiful red flowers, attains a height of six or more fathoms in the forests, but is of small dimensions when growing outside. It is common and well known, and is used in all kinds of construction. The wood is of ordinary appearance, but is highly prized for its strength and durability.
BLANCO."

"This species is identical with the 'blood-wood' or 'jarool' of India and Burma, where, on account of the durability of its wood in water, it is used for boat and ship building. LIEUT. SAFFORD, U. S. N."

"Is a tree which grows twelve to fourteen meters high and is found in the Philippines; there are two varieties, one red and the other ordinarily of a white color. Its wood is prized for all purposes on account of its toughness, durability in water and resistance to climate.

COLOR.—Varies from a reddish white to a light brown red.

TEXTURE.—The fibers are longitudinal and compressed; the pores long and narrow, sometimes having the appearance of small crevices; breaks in short splinters; the shaving is rough, little curled and porous. The white variety is of a somewhat coarser texture than the red, is inferior to it in quality, which is preferred in ordinary as well as in naval construction in the interior structure of ships.

This wood is very much prized for all kinds of construction on account of its great durability. SALVADOR CERON, page 283."

BANGCAL.

Sarcocephalus cordatus, Miq. (Rev. Vidal, p. 147.)
Sarcocephalus glaberrimus, F. Vill. (App. F. Vill., p. 104.)
Nauclea glaberrima, Bartl.
Rubiaceæ.

SYNONYMS—Bancal, Bangcal, *Tag.* Bangal, Cabag, Hanbabalos, *Visayas.* Bancal, *Pampanga.* Bulala, *Ilocos.*

WHERE FOUND—Islands of Luzon, Panay and Mindanao.

DESCRIPTION—*Second Group.*

"Is a tree of the first order, wood of a greenish yellow; longitudinal fiber, texture somewhat filaceous, pores not very well marked, breaks in short splinters, and at times in long ones, some pieces are found to be very brittle.

It is principally used in naval construction in the fabrication of bancas, and for ships' planks, and in ordinary building, for floor planks and rafters, being preferred for uprights in buildings which are exposed to the weather, when it will last for twenty years and more.

It is used for making chairs and desks, for barrel staves and tubs.

Used in the interior construction of houses, it changes after a lapse of time into a species of sawdust or powder.

Before the conquest the Visayans used it for coffins.

Señor Cortes made following tests:

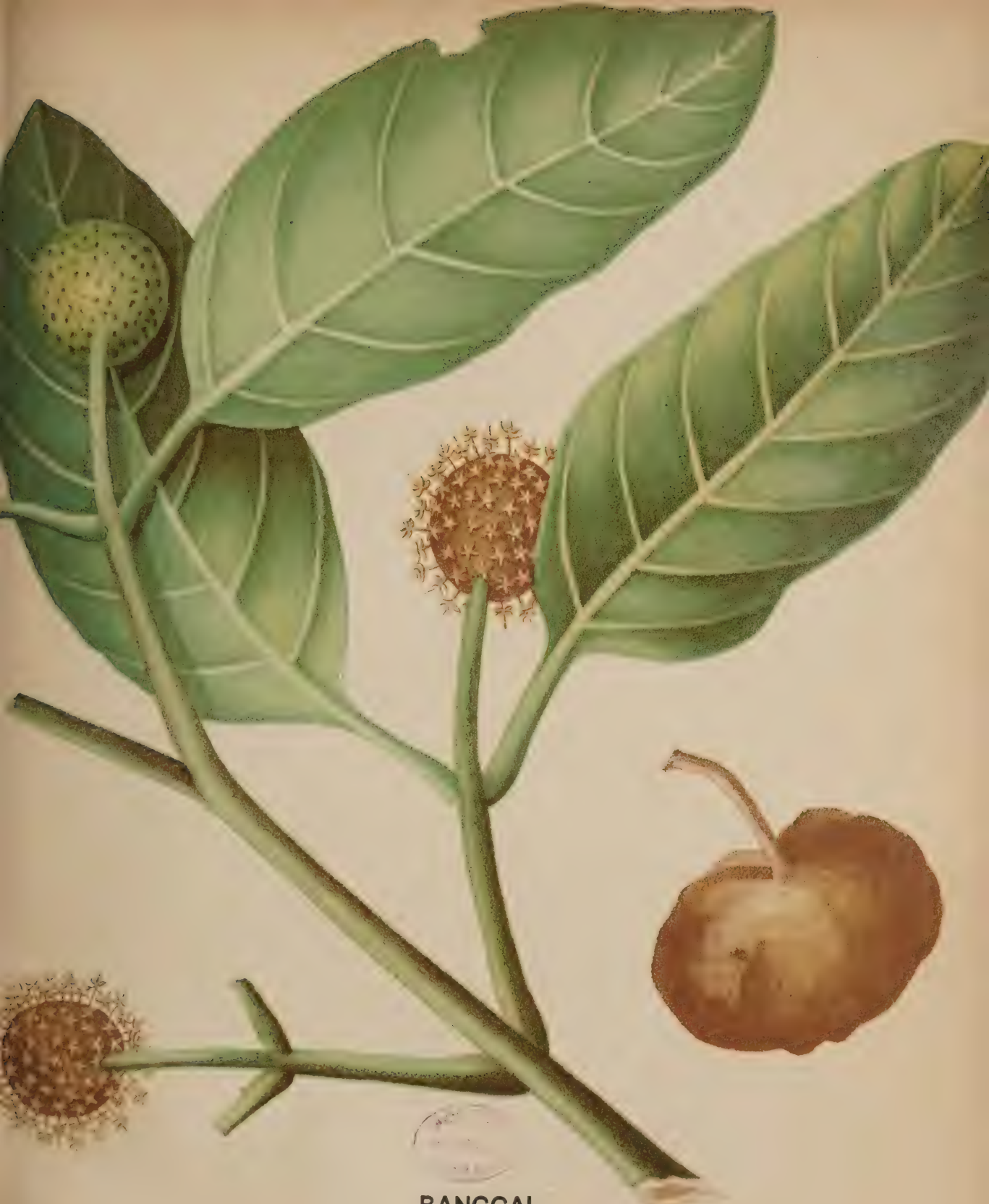
ORIGIN	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS	ORIGIN	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS
Cavite	2	0.752	149	0.559	Mindoro	2	0.928	93	0.359
Tayabas	5	1.440	100	0.412	Negros	1	1.566	186	0.697
Nueva Ecija	2.3	1.280	143.5	0.557	Bulacan	3	0.672	138	0.545

D. VIDAL."

"FIRST ORDER.

COLOR.—Golden, greenish yellow.

TEXTURE—Somewhat filaceous and pores not well defined, fiber longitudinal, breaks in long splinters. It is used principally in the construction of bancas, it is



BANGCAL.

Sarcocephalus cordatus, Miq.
Sarcocephalus glaberrimus. F. Vill.
Nauclea glaberrima. Blanco.
Fam. Rubiaceæ.

Atlas, Flora de Filipinas, Blanco, lám. *223.*

also used for planks in building. It abounds in many parts of the islands; for example, in the provinces of the center and south of Luzon.

ELASTICITY—0.005; breaks with a weight of 31.804 kilograms; weight in air 6.734 grains, and specific gravity 0.521. S. VIDAL."

"Gives logs up to twenty-four feet long by sixteen inches square. This wood is of a yellow color and very easy to work. It is used for general joiners' work in house-building, etc. FOREMAN."

"Leaves opposite, broad lanceolate, obtuse at apices, undulating, entire and smooth. Petioles short, and wide stipules between the petioles. Flowers terminal very numerous, united upon a globular receptacle (neither two nor three) covered with a one-leafed and deciduous spathe, full of cavities or pits, the upper edges of which are divided into four and five woody teeth. Calyx, the spathe referred to. The four and five small teeth surrounding the pits belong to the flower. Corolla longer than the calyx, funnel-shaped, with the limb divided in four or five obtuse and concave parts. Stamens four or generally five. Filaments none. Anthers fixed on the divisions of the corolla. Style much longer than the stamens. Stigma thick and conical. Fruit many very small seeds fixed in a kind of raceme or panicle below the calyx and hidden by a woody receptacle. It is possible that this may be caused by insects.

See General Appendix—Rubiaceas.

Tree larger than the body of a man, common in many parts and well known. Leaves are half a foot in length and more than three inches wide. The fruit is as large as a walnut and when ripe has an agreeable odor. The flowers are very beautiful. The roots have a bad taste. The wood is used by the natives principally for making tubs for indigo. It is of a yellow color. It is related in history that before the coming of the Spaniards the Visayans used it for making coffins on account of its durability. It is highly prized in the manufacture of chairs and desks on account of its toughness and fine color.

The manner and place where the seeds grow are very unusual, as I have above remarked, and as I have carefully noted in a tree between Anilas and Banate in the province of Iloilo. In view of which I am led to believe the fruit aborts or that those seeds (or what appeared to be seeds) growing in racemes may have been the work of insects or a freak of nature.

In the Mambog the seeds are inside the calyx or at least they appeared to be.

See Spec. Stipulosa D. C., Prod. IV, 346.

I have seen cotton thread, after having been treated with lye and oil of ajonjoli, dyed a dirty yellow with the roots of this tree, powdered. The color is durable. If the thread thus colored be put into a tub of indigo, not of too intense a color, it will be dyed a green, as firm as any that I have seen in the fabrics of India.

It differs from the Species Orientalis of D. C., page 345, which is the Bancalus of Rumfio, while my Bancal is a tree.

It flowers in May and June. BLANCO."

"TREE OF THE FIRST MAGNITUDE.

COLOR.—Golden and greenish yellow.

TEXTURE.—Filaceous, fibers longitudinal, pores not very well marked; breaks in long splinters. Is abundant in many parts of the central provinces of the Philippines; is generally used, after being sawed into shape, for house construction and for small boats. SALVADOR CERON, page 282."

BANSALAGUIN.

Mimusops parvifolia, Br.
Fam. Sapotaceæ.

SYNONYMS—Bansalaguin, Bansalagui, *Tag.* Bansalague, Bansalagon, *Vis.*

WHERE FOUND—Islands of Luzon, Mindanao, Mindoro, Panay, Paragua, Samar.

DESCRIPTION—*First Group.*

"FIRST ORDER:

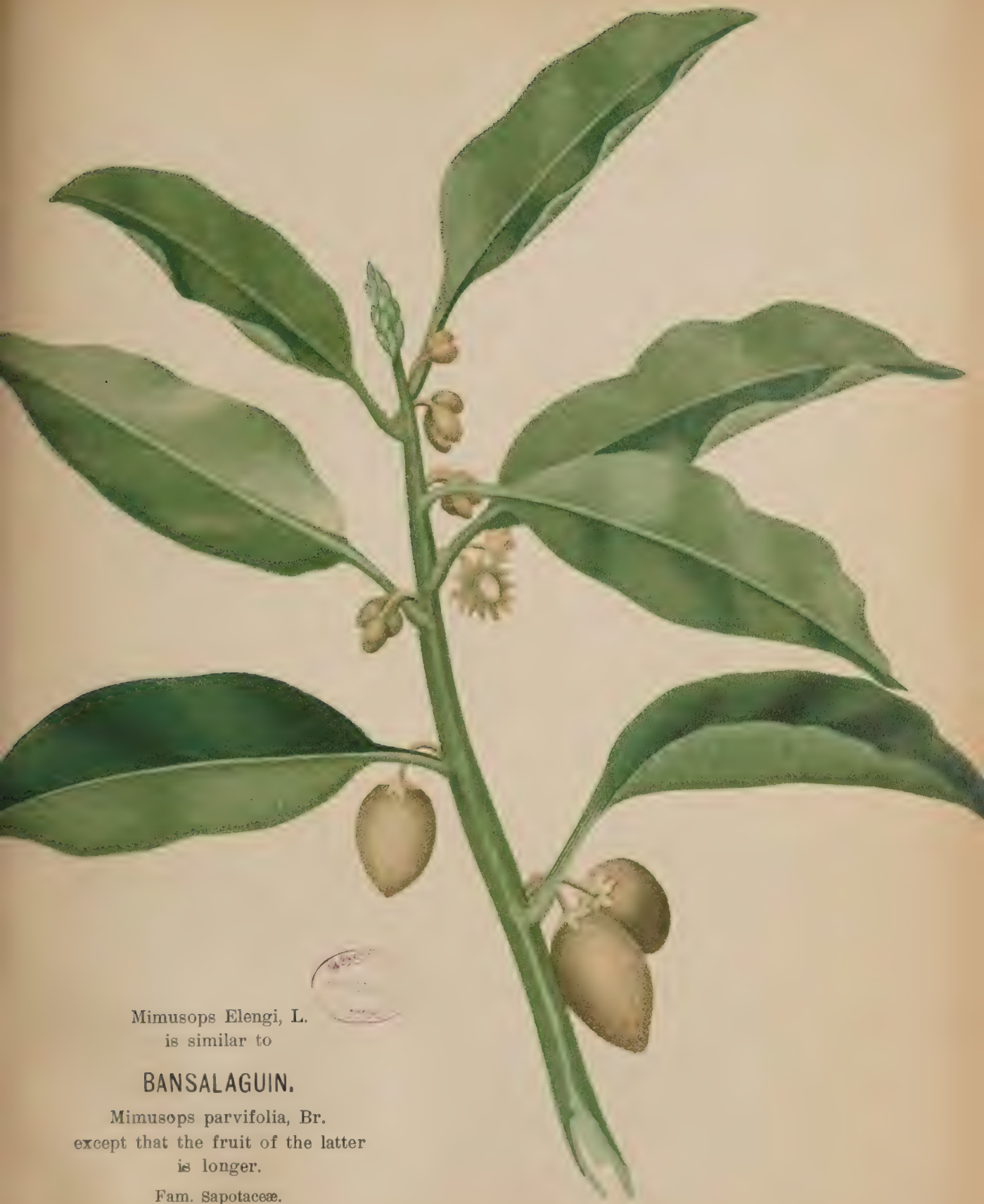
COLOR.—Light rose, with ashy-colored streaks, or a uniform clear red.

TEXTURE.—Solid, with small pores, fibrous, breaks in long splinters. On account of its elasticity and strength, it is becoming very much esteemed, especially in domestic construction, for joists, etc. There have been very few tests made with this wood. Señor Cortes obtained the following results: Elasticity, 0.002; breaks with weight of 58.078 kilograms; weight in the air, 9.280 grams, and specific gravity, 0.676. The elasticity and weight of wood specimens from Tayabas ought to be very superior to that indicated by the figures above, especially the first. S. VIDAL."

"Gives logs up to forty-five feet long by eighteen inches square. It seems to be known in Europe as bullet-tree wood. It can be driven like a bolt, and from this fact and its durability it is frequently used for tree nails in ship-building in Manila, etc. It is also used for axe and other tool handles, belaying pins, etc., and on account of its compact, close grain it is admirably adapted for turning purposes. It will last well in the ground. FOREMAN."

"From twenty to thirty feet long, and twelve to sixteen inches square. Special sizes forty to forty-five feet long, seventeen to eighteen inches square. Seems to be known in Europe as bullet tree wood; can be driven almost like a bolt and, from this fact and its durability, it is invariably used for tree nails in ship bnilding at Manila, etc. It is also used for axe and tool handles, belaying pins, etc., and on account of its solidity, and very close grain, it is admirably adapted for turning purposes; it lasts well in the ground. BROWN."

Leaves alternate, ovate-lanceolate, sharp, coriaceous, entire, the young leaves with red silky down, and the old ones smooth. Petioles rather short. Flowers toward the extremity of the branches. Calyx in eight parts, biserial; the four



Mimusops Elengi, L.
is similar to

BANSALAGUIN.

Mimusops parvifolia, Br.
except that the fruit of the latter
is longer.

Fam. Sapotaceæ.

outside ones red, silky, the four interior, white. Corolla, triserial; the outside divisions linear. Eight fertile stamens, very short, inserted in the base of the corolla. Anthers, arrow-headed, lanceolate, bilocular. Eight sterile stamens, alternate, united with the fertiles at the base, like petals, woolly on the margin. Ovary, oblong and hairy. Style, one, longer than the corolla. Stigma simple. Berry somewhat globular, one-celled. One seeded. Seed oblong, depressed on the sides, ribbed. Shell lustrous. Albumen pulpy. Cotyledons foliaceous. Radicle inferior, cylindrical. BLANCO."

"TREE OF THE FIRST MAGNITUDE.—The specific name has not yet been determined.

COLOR.—White, rose with ash-colored streaks or a uniform light red.

TEXTURE.—Solid, the pores small, fibrous; this wood breaks in long splinters.

Grows principally in the southern part of the Philippines. On account of its notable elasticity and resistance it is much used in ordinary construction; especially suitable for joists. SALVADOR CERON, page 278."

BATICULIN.

Litsea obtusata, B. et H., F. Vill.
Olax Baticulin, Blanco.
Fam. Laurineæ.

SYNONYMS—Marang, Baticulin, Baticuling, *Tag.* Bacan, *Cagayan.* Ansohan, Hingdan, *Visayan.*

WHERE FOUND—Islands of Luzon, Mindoro, Romblon, Samar.

DESCRIPTION—*First Group.*

"Is a tree of large dimensions with horizontal branches.

COLOR—From a yellowish white to a yellowish green; has an agreeable smell which soon disappears.

TEXTURE.—Abundant pores of medium size, medullary rays, fine but distinctly marked; light, easily worked and will take on a fine gloss. The fiber is strong and not very straight.

The anay only attacks this wood when it can find no other.

It is used in ordinary construction sawed in thin planks for partitions. It is also used in cabinet making.

This species should not be confounded with the Millingtonia cuadripinnata of P. Blanco, to which the name of Baticulin is also given, and make a white lumber, very clean, soft and with an agreeable smell and is very much used in cabinet making, on account of its extreme durability when carefully selected.

In Visayas this wood is called Ansohan.

There are many varieties, the characteristics of which are not very well described, thus: Baticulin-dagon, Surusuru, Surusurin-dagon, id. Mayapis, id. Matang, id. Maragasili, etc.

Señor Cortes made following tests:

LOCALITY	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS	LOCALITY	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS
Bataan	3.2	0.800	150	0.560	Pangasinan	1.4	0.664	231	0.859
Laguna	4	0.568	127.5	0.489					
Tayabas	2.7	0.668	114	0.440	Leyte	2.8	0.603		

D. VIDAL."

"COLOR.—Yellowish white to yellowish green.

TEXTURE.—Loose, with many pores of medium size; medullary rays fine, but clearly marked; it is easily worked, and polishes well. It is employed as sawed lumber in ordinary construction. It is plentiful in many provinces of the Archipelago, especially in Southern Luzon, Mindoro and the Visayas. Elasticity indicated by a lengthening of 0.005 meters; breaks with a weight of 21.394 kilograms; weight in the air, 6.590 grams, and specific gravity, 0.50.

Many varieties are omitted here, on account of lack of information, such as Baticulin-dagon, Surusuru, id dagon, id Mayapis, id Matang and id Maragisili of Laguna, etc. S. VIDAL."

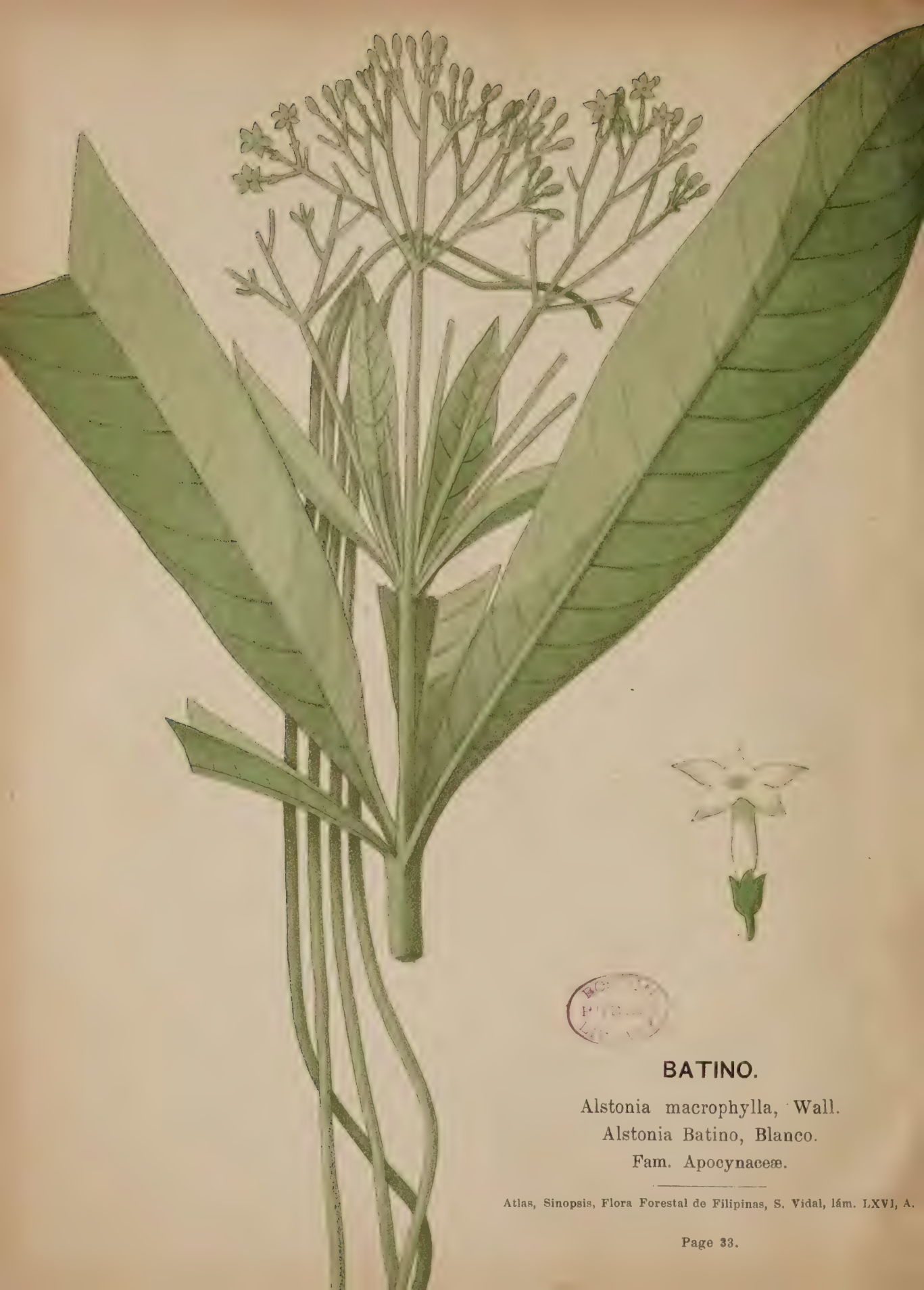
"The wood called Baticulin in the Tagalo provinces is one of the most useful and most prized in these islands. It is soft and very easy to saw and work; very durable, and being somewhat spongy and loose in texture, and bitter. It is secure from the anay, which prefers to feed on hard wood. It is called Hingdon in the provinces of Visayas, but, in my opinion, it is not the same Baticulin, but a species of it, there being a difference in the color and odor; the Hingdon is odorous and aromatic. Nevertheless, there is in the Visayas a species of Hingdon that is not very odorous, nor aromatic. It is called Ansohan; it is soft and easy to work, and equal to Hingdon in durability and utility. It is suitable for the manufacture of boards, boxes, writing desks, and other similar articles, being light and durable. On this account it is very much prized and sought for.

It has an odor similar to rosewood, which is very strong, especially when it is worked.

It is a substitute for pine in this country, and is equally prized.

P. DELGADO."

A tree of the laurel family with diœceous flowers; branches striated, corky. Petioles thick, flattened, dark-colored, rough, one to two centimeters long. Leaves cuneate at the base, obovate-oblong, rounded at the apex, sometimes emarginate, length twelve to twenty-four centimeters, breadth forty-five to seventy-five millimeters, margin thickened and rolled back, coriaceous, glossy above, often becoming black in drying, below with fine down, glaucous or yellowish; ribs stout, dark-colored,



BATINO.

Alstonia macrophylla, Wall.
Alstonia Batino, Blanco.
Fam. Apocynaceæ.

Atlas, Sinopsis, Flora Forestal de Filipinas, S. Vidal, lám. LXVI, A.

roughly striated, lateral veins nine to twelve on each side, above sunken and thin; below thick, dark and prominent, with inconspicuous reticulation. Anthers four-celled. Flowers in heads, heads globose at first, five millimeters in diameter, afterwards expanding to fifteen millimeters, growing in racemes, the racemes shorter than the leaves. Bracts of the involucre orbicular. Younger pods included by a pear-shaped perianth.

It is very difficult, if not impossible, to say whether this is the Olax Baticulin of Blanco, as Fernandez Villar supposes, on account of the incompleteness of the description, and because this common name is applied to several distinct species of the genus. SEBASTIAN VIDAL."

(In "Revision de Plantas Vasculares. Filipina, 1886," Province Bataan).

OLAX BATICULIN.

"Calyx dome-shaped, entire truncated and which continues to grow at maturity. Stamen, pistil or drupe dry, which grows within the calyx; nut crustaceous with only one seed.

Tree with horizontal branches; leaves alternate and bunched at the extremity of the branches, entire, oblong and pinnately formed. Flowers axillary, growing in a spike.

The thin planks, called Baticulin in Manila, are sawed from this wood; they are also sawed from other species.

The Baticulin is prominently grained and has an agreeable odor, which becomes more pronounced upon being planed.

It is found in the mountains of Panguil, Province of Laguna, and in other parts. BLANCO."

BATINO.

Alstonia macrophylla, Wall.
Alstonia Batino, Blanco.
Fam. Apocynaceæ.

WHERE FOUND—Islands of Luzon, Mindoro.

DESCRIPTION—*Second Group.*

"Calyx five cleft. Corolla twisted, hypogenous, hypocraterform or salver-shaped, larger than the calyx, the tube and throat covered with small scales. Stamens five, inserted in the tube of the corolla, and do not protrude. Filaments short. Anthers almost sessile, free lanceolate. Style filiform which becomes thicker at the apices. Stigma ending in a small head. Pericarps linear and long. Seeds many, linear, compressed, and the extremities covered with a wooly fringe or tuft.

Tree of twenty or thirty yards in height, milky; branches horizontal; leaves growing in whorls, smooth. Flowers in panicles, terminal, white and male; the

wood is white and heavy. The Indians use it in building for joists, rafters and planks, it being durable when not exposed to climatic action; it is used also for uprights or posts. It is found in the forests of the low lands of the province of Laguna and in other parts. It does not grow at a higher altitude than 500 yards above the sea level.

The specific name of Batino is what the Indians call it, and also distinguishes it from Dita, which is the *Echites Scholaris* of the *Flora Tagalo Batino.*

BLANCO, 2d Ed., page 129."

BATITINAN.

Lagerstræmia Batitinan, Vidal.
Lagerstræmia hexaptera, Miq.
Fam. Lythrarieæ.

SYNONYMS—Batitinan, *Tag.* Natjubo, Lumati, Buguaron, Manglate.

WHERE FOUND—Islands of Luzon, Masbate, Mindoro.

DESCRIPTION—*First Group.*

"FIRST ORDER:

Attains a height of thirty meters, growing generally very straight.

COLOR.—Ashy red, intense gray olive or yellowish dark gray with greenish spots.

TEXTURE.—Very compact with numerous small pores, not very well defined, but very uniform.

It is used in domestic construction, sawed into all kinds of pieces; it is also employed in naval construction. It is plentiful in the Visayas, where it is principally used for framing houses. Large quantities are cut in the forests of Tayabas.

The bark annually falls from this tree, for which reason, in the Laguna, it is called Natjubo (one who denudes). Upon arriving at a certain age, it becomes hollow. It is used for planks in naval construction, resisting the action of the water better than the Banaba and Mangachupi.

Upon becoming dry it is difficult to saw.

Señor Cortes made tests with specimens from Leyte, with following results: Elasticity seven lines, and breaks with a weight of 1.348 ounces. D. VIDAL."

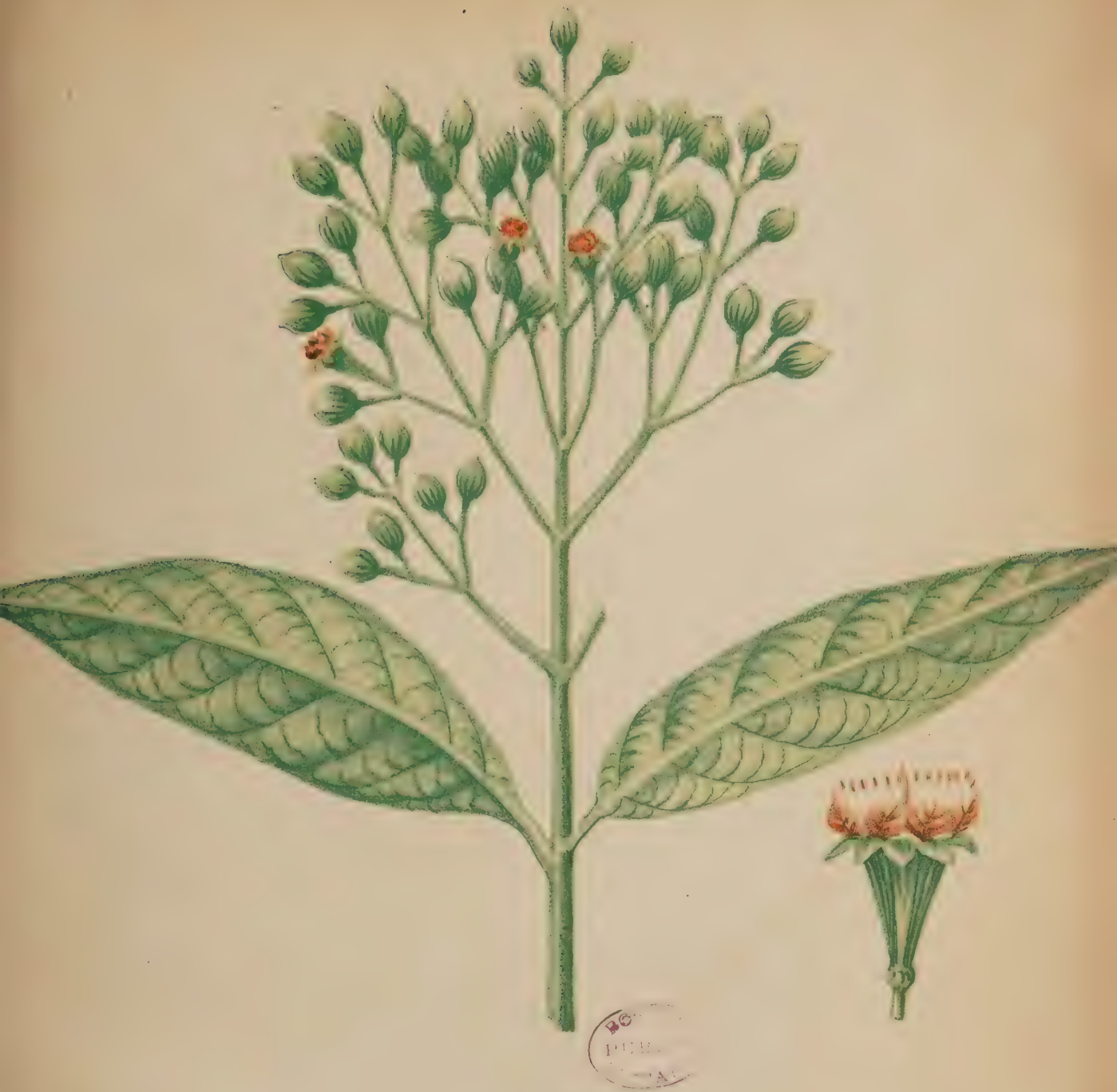
"COLOR.—Ashy red and intense olive gray.

TEXTURE.—From compact to very compact, with numerous pores not very well marked.

It is very much used in domestic and naval construction. I do not know whether any data as to its properties exist.

Large quantities are taken from the forests of Tayabas. S. VIDAL."

"Gives logs up to forty feet long by eighteen inches square. Is very strong, tough and elastic; generally used for ships outside planking above water. It

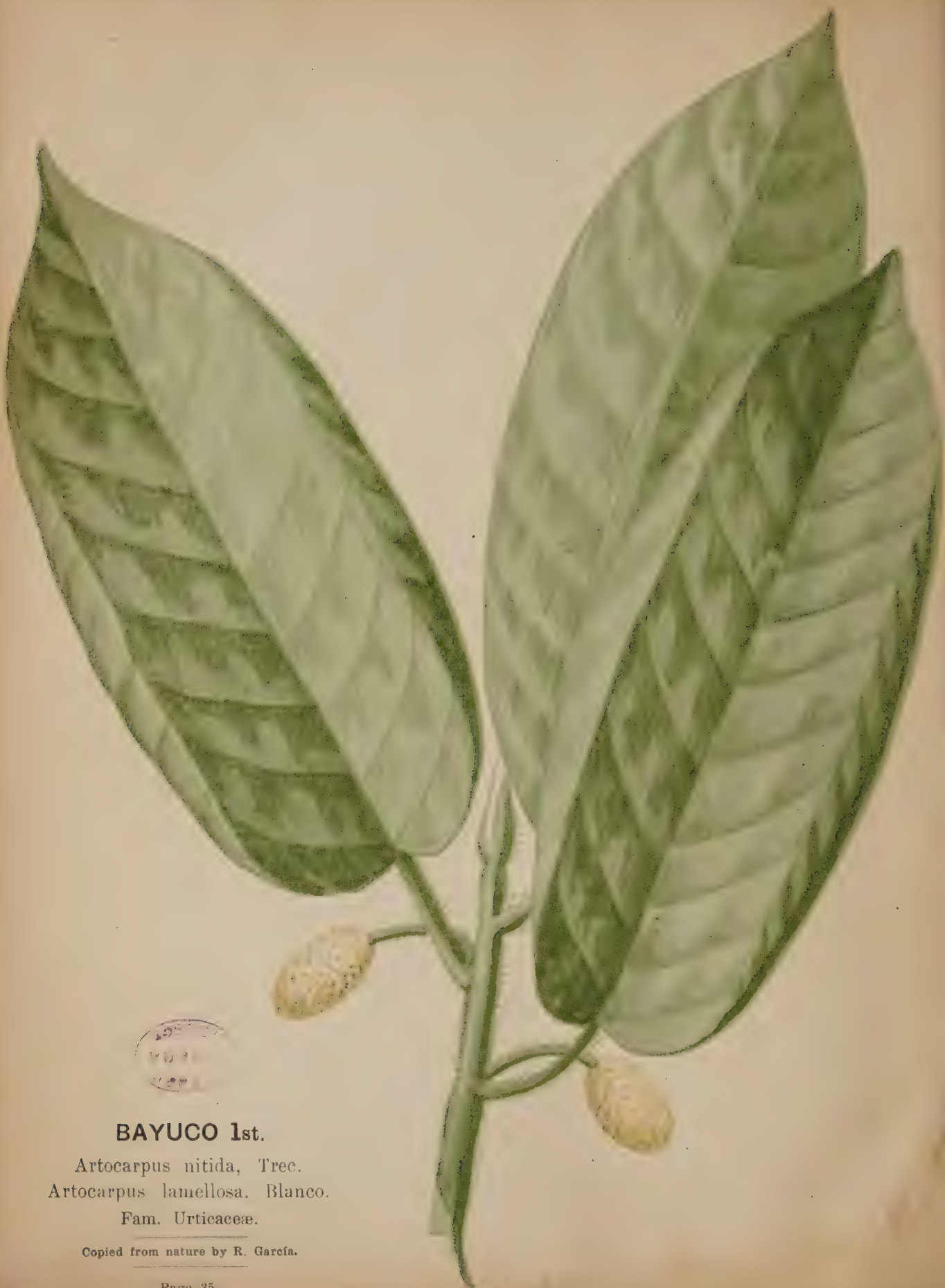


BATITINAN.

Lagerstrœmia Batitinan, Vidal.

Lagerstrœmia hexaptera, Miq.

Fam. Lythrarieæ.



BAYUCO 1st.

Artocarpus nitida, Trec.
Artocarpus lamellosa. Blanco.
Fam. Urticaceæ.

Copied from nature by R. García.

stands the climate well when properly seasoned; is a wood of the first quality and can be used for any purposes except interment in the ground and exposure to ravages of sea worm. This wood is very much stronger than Teak and could be used to advantage in its place for almost all purposes. FOREMAN."

"From twenty-two to twenty-seven feet long, twelve to fifteen inches square. Special sizes thirty-five to forty feet and eighteen inches square. Very strong, tough and elastic; generally used for ships outside planking above water. Stands climate well when properly seasoned. Is a wood of the first quality, and can be used for any purpose except interment in the ground or exposure to ravages of sea worm. This wood is very much stronger than Teak, and could be used in its place with advantage for almost all purposes; it makes a good substitute for Black Walnut in furniture. BROWN."

"Tree large, branches of a cylindrical form, somewhat flattened at the knots; light-colored. The young branches are quadrangular and are very often winged along the angles. The axillary buds are conical, scaly and compressed. Petioles nearly one centimeter in length and of dark color.

The leaves are alternate, nearly opposite. The base, cuneate, decurrent in the petiole, oblong, obtuse-acuminate, 6.14 centimeters in length, 30.45 millimeters in width, smooth. Lateral veins from six to eight on each side, net-veined. Flowers in corymbose panicles, multiflorous, terminal, branches quadrangular, usually inclined to be winged; pedicellate with the pedicels jointed; the tube of the calyx is hexagonal, with the angles keeled or winged. The limbus of corolla has six teeth. The teeth broadly triangular, covered with fine gray or ashy down. The petals wrinkled, of violet color, fixed and doubled in the lower part.

The stamens are numerous and protruding.

The filaments are flexible.

The anthers are round in form. The ovary oval and ending in a point, smooth, and enclosed by the calyx to the middle; measures two centimeters in length.

The seeds have wings. VIDAL."

BAYUCO, 1ST.

Artocarpus nitida, Trec.
Artocarpus lamellosa, Blanco. (*See app. Fem. p. 203.*)
Fam. Urticaceæ.

SYNONYMS—Bayuco, Bayaco.

WHERE FOUND—Islands of Mindoro and Panay.

DESCRIPTION—*First Group.*

"I must mention this famous tree, although I have not seen it. It is highly prized in Iloilo on account of its hardness and durability. It is used as pillars and posts for churches and houses. An Indian mountebank, a native of Malabar, told me that it bears an edible fruit, rough outside, similar to the filbert.

I think it must be a species of Enfovia or Sapindo. It is plentiful in Capiz and elsewhere. It is very straight. It is called Bayuco or Bayaco. (See General Appendix Artocarpaceas.)

Leaves alternate, ovate, long, sharp-pointed, with the edges curved inward, entire, stiff and smooth. Flowers monœcious. Male. Female axillary, on a very small receptacle, sessile, oval, full of small flowers. Calyx and corolla none. Stamens, none; style, one, short, growing over the ovary, the surface of which is a little elevated, and on its edges are some little plates, very thin, almost sessile, that have the appearance of small glands. Stigma, one, simple. Fruit, the receptacle is full of seeds covered with membraneous skin, as in the other species.

P. BLANCO, p. 465, 2d ed."

BETIS.

Azaola Betis, Blanco, (p. 281, 2d ed.—Fern. app., p. 125.)
Payena Betis, Blanco (old classification).
Fam. Sapotaceæ.

SYNONYMS—Betis, Pailan, Bacayao, *Tag.* Pagpagan, *Cagayan.*

WHERE FOUND—Islands of Luzon, Masbate, Mindoro, Panay.

DESCRIPTION—*First Group.*

"FIRST ORDER, although P. Blanco classifies it as second.

COLOR.—Light brown to a purplish red, with lighter grain, reddish ashy gray.

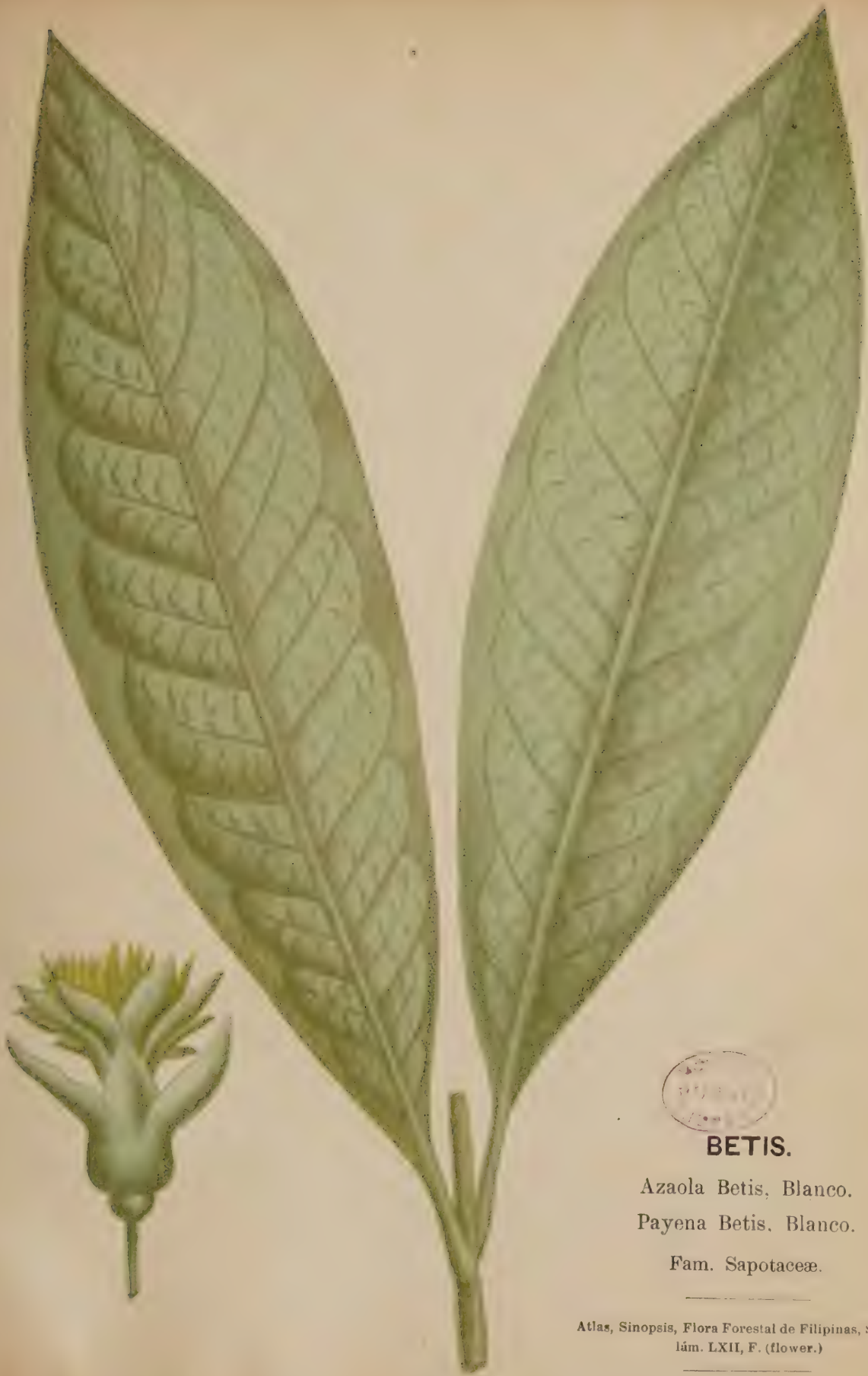
TEXTURE.—Solid, pores lightly marked and scarcely perceptible; brittle, breaks without splinters. It is prized above all other wood by naval constructors in the construction of keels. It is useful in all kinds of building.

The mean of the tests made give following results: Elasticity, 0.0037 m.; breaks with a weight of 31.718 kilograms; weight in the air, 8.015 grams, and specific gravity, 0.719. S. VIDAL."

"Gives logs up to sixty-five feet long by twenty inches square. It is proof against sea-worm; is used for salt or fresh water piling, piers, wharves, etc.; also for keels and many other parts of ship-building, and where a first-class wood is necessary. It is somewhat scarce. FOREMAN."

"From twenty-five to forty feet long, twelve to seventeen inches square; special sizes, sixty to sixty-five feet and eighteen to twenty inches square. Resists sea-worm; used for salt or fresh water piling, piers, wharves, etc., also for keels and many other purposes in ship-building, and where a first-class wood is necessary. Somewhat scarce. BROWN."

"Leaves bunched in the extremity of the branches, lanceolate, wider just above the middle, repand and stiff. Petioles very short, without stipules. Terminal



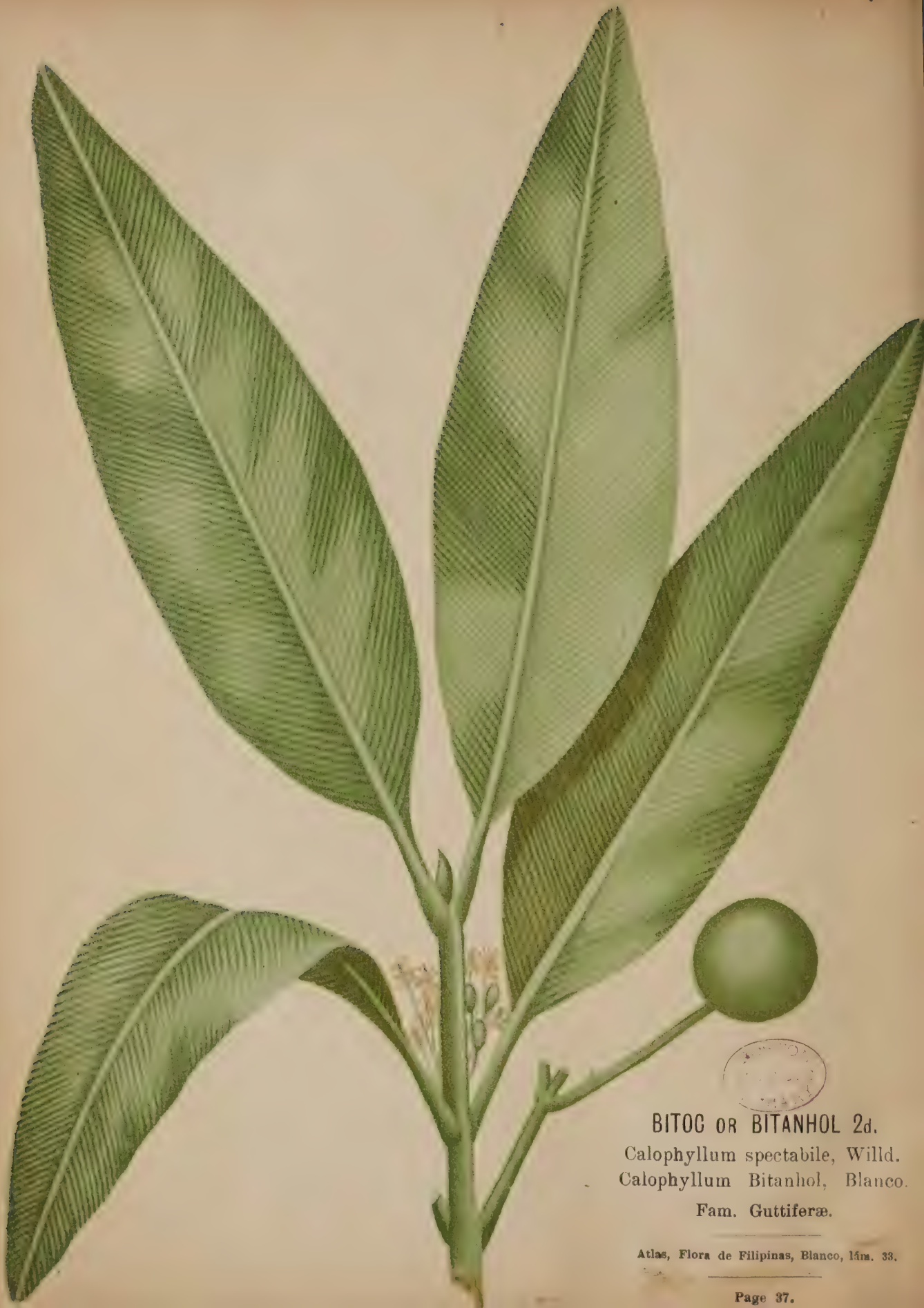
BETIS.

Azaola Betis. Blanco.

Payena Betis. Blanco.

Fam. Sapotaceæ.

Atlas, Sinopsis, Flora Forestal de Filipinas, S. Vidal, lám. LXII, F. (flower.)



BITOC OR BITANHOL 2d.

Calophyllum spectabile, Willd.

Calophyllum Bitanhol, Blanco.

Fam. Guttiferæ.

Atlas, Flora de Filipinas, Blanco, lám. 33.

flowers in racemes, very close together. Peduncle, long. Calyx, inferior, somewhat shorter than the corolla, of one piece, swollen below and compressed at the middle, limb composed of four parts which are long and linear. Corolla of same color as calyx, fixed in the receptacle, monopetalous, with the tube short, divided with ten lanceolate and straight divisions, the five alternate inside the others. Stamens nineteen to twenty inserted on the throat of the corolla. Filaments almost lacking. Anthers long, terminating in a bristle. Ovary, globular, sessile, within the calyx. Style very long and deciduous. Stigma as with lobes. Fruit oblong, sharp-pointed, with about six seeds, also oblong and covered with a fragile and membranous shell, which has one side protruding or elevated, marked with a long cicatrice; four aborted.

Differs from the Achras disecta and from the variety Balata of Pers.

As this appears to be a new genus I have named it after Don Ygnigo Gonzalez y Azaola in testimony of my gratitude to him for information and books which have been useful to me in the writing of the work. BLANCO."

"A TREE OF THE FIRST MAGNITUDE.—One of the most highly prized in the Philippines.

COLOR.—Light, brown red, livid red with grain of a clearer color, gray, ashy, or reddish.

TEXTURE.—Solid; pores scarcely perceptible or lightly marked; is a brittle wood; is well known to naval constructors; is unrivalled for keels; is used in all kinds of construction. SALVADOR CERON, page 283."

BITOC or BITANHOL 2d.

Calophyllum spectabile, Willd.
Calophyllum Bitanhol, Blanco.
Fam. Guttiferæ.

SYNONYMS—Bitoc, Bitog, Bitanhol, *Tag.* Bitaog, *V. P. I.*

WHERE FOUND—Provinces of Bataan, Cagayan, Pampanga, Nueva Ecija, Island of Luzon.

DESCRIPTION—*Third Group.*

"TREE OF FIRST ORDER.

Very plentiful, especially in province of Nueva Ecija, from whence comes all that is sold in Manila.

COLOR.—White or light rose, for which reason efforts are sometimes made to pass it off as Calamansanay, to which it is very inferior.

TEXTURE.—Fine, compact. The wood is hard, and in ordinary construction is used for planks, rafters and other pieces. D. VIDAL."

"Leaves narrow, obtusely acuminate, with very slender transverse veins, entire. Petioles short. Flowers axillary in panicles, and very few. Calyx inferior, meaty, of four half-rounded and concave parts, the outer ones overlapping the others with the edges thin, like petals. Corolla none. Stamens numerous, fixed at the base of the ovary. Ovary globular. Style very short. Stigma simple. Nut has four sides, at which it opens; has one compartment containing one seed.

Tree common in the forests and generally known as Betanhol. Its leaves are one or two inches wide and five or six long. The stamens are not 'paliadelfos.'

BLANCO, p. 429, 2d ed."

CALANTAS.

Cedrela Toona, Roxb. } *Fern. app. p. 45.*
C. odorata, Blanco. }

Fam. Meliaceæ.

SYNONYMS—Calantas, *Tag.* Lanigpa, Lanigda, *Visayan.* Lanipga, *Vicol.* "Indian Cedar." Catingin, *Ilocano.*

WHERE FOUND—Islands of Luzon, Mindoro, Negros, Paragua.

DESCRIPTION—

"FIRST ORDER:

COLOR.—Various shades, viz: blood red, and from brick red to a purplish red; in some specimens an ashy rose.

ODOR.—Agreeable; during the process of burning, odor resembles that of Juniper.

TEXTURE.—Somewhat coarse and lax, breaks with short splinters; pores, well defined.

It is not much subject to attacks from insects. It is used in the construction of bancas (canoes) and a superior quality of cigar boxes; it is also used in the construction of partitions and ceilings, in place of Baticulin, being quite as durable.

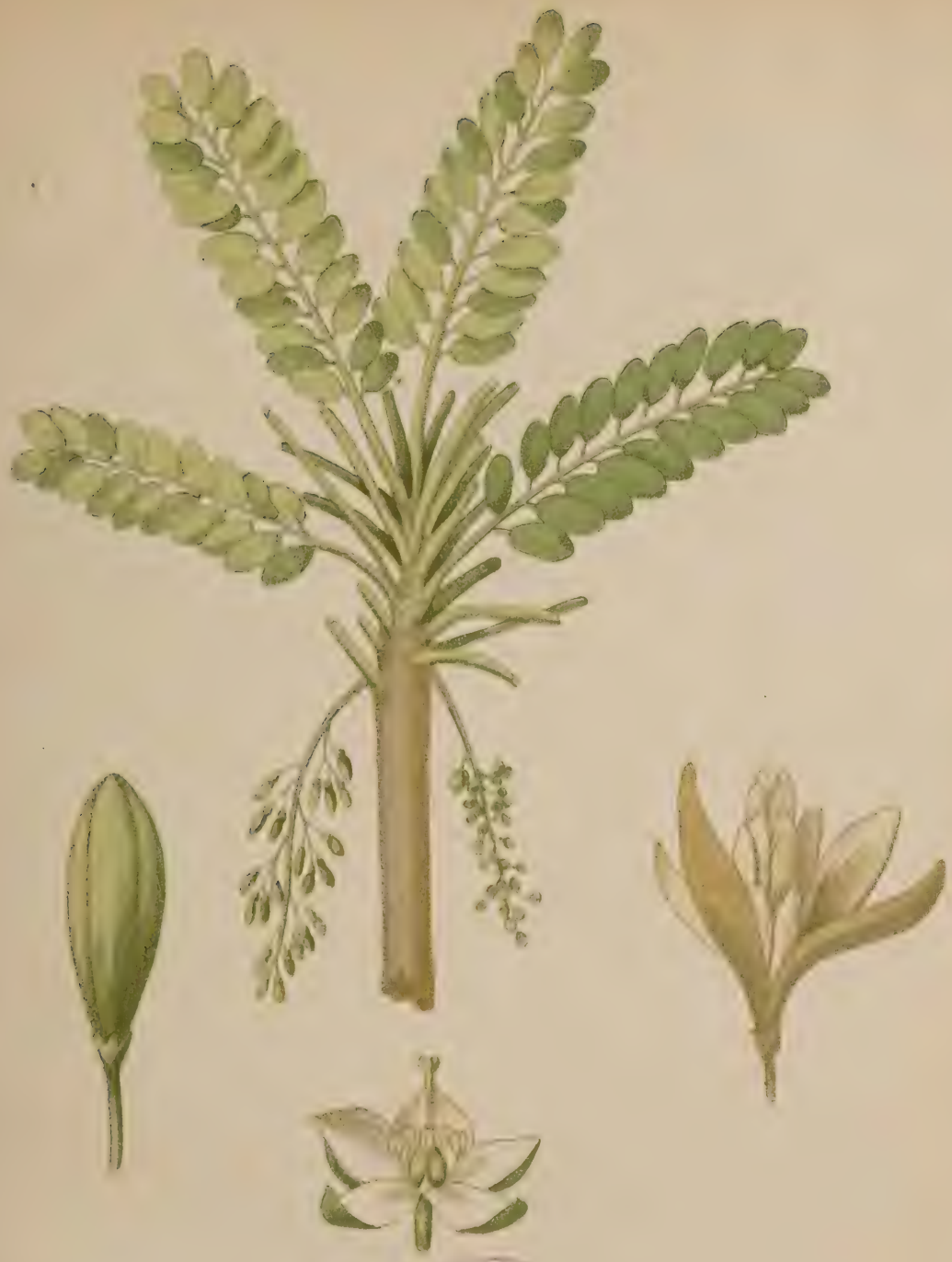
It is very abundant in the Archipelago. Another variety of this wood has a clearer color; it has an odor, but not so pronounced as the above.

Señor Cortes made following tests:

LOCALITY.	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS	LOCALITY	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS
Bataan.....	3.	0.860	164	0.631	Misamis.....	3.	0.464	126	0.482
Tayabas.....	4.7	0.676	135	0.495					

S. VIDAL."

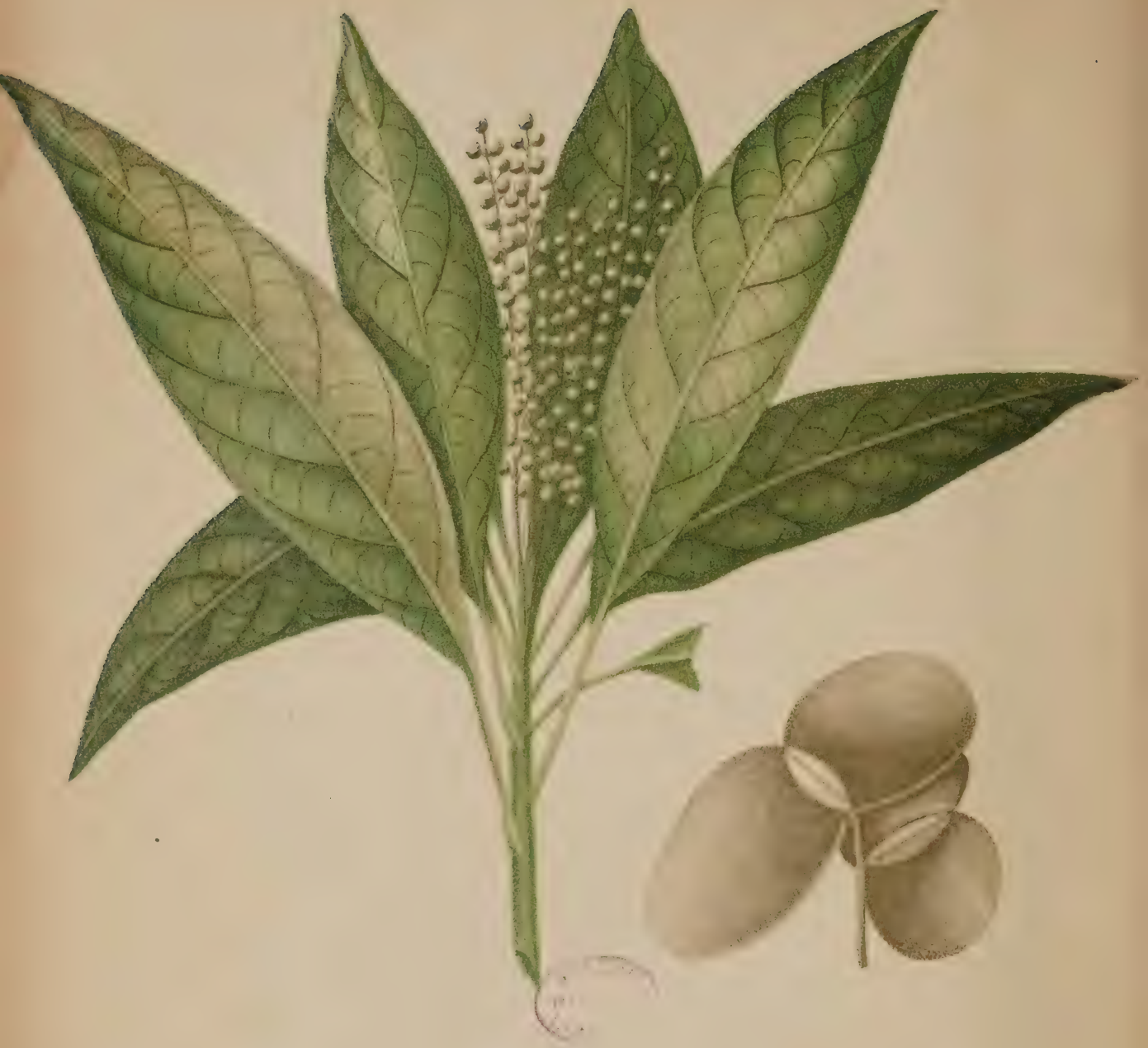
"Leaves sometimes opposite, sometimes alternate, pinnately compound; leaflets obliquely ovate, entire and smooth. Flowers in loose panicles. Calyx very small with five-parted bell-shaped at first and afterwards flat. Corolla of five petals



CALANTÁS.

Cedrela Toona, Roxb.
Cedrela odorata, Blanco.
Fam. Meliaceæ.

Atlas, Sinopsis, Flora Forestal de Filipinas, S. Vidal, lám. XXIX, G. figs. *1, 3, 4.*



CALAMANSANAY.

Terminalia Calamansanay, Rolfe.

Terminalia bialata, Vid.

Fam. Combretaceæ.

Atlas, Sinopsis, Flora Forestal de Filipinas, S. Vidal, lám. XLVIII.

much larger and longer than the calyx, lanceolate, hairy inside and united at the base to the lower part of the receptacle; stamens five, close to the pistil and of the same length as the pistil, inserted in the receptacle, which has five angles and adheres to the lower part of the ovary. Anthers, inclined, curved; ovary, globular, hairy, adhering to the receptacle. Style, thick, shorter than the corolla. Stigma peltate, with five angles and with five lines radiating from the center. Capsule almost round with five compartments, each with a quantity of egg-shaped seed, compressed, and provided with a membranous ridge or keel.

Tree of first order, well known in these islands; is erroneously called cedar in America.

The seeds are an inch long; leaves four inches from one end to the other. Is of a carnation color, and odorous; the natives use it in the construction of their boats on account of its durability. P. BLANCO, p. 130, 2d ed."

"The Cedrela Toona is of wide distribution, being found in India and in New South Wales. Like the fragrant Cedrela odorata of Central America and the West Indies, to which it is very closely allied, it is commonly called Cedar, from the resemblance of its wood in odor and color to true Cedar, and like that species it is much used for cigar boxes. LIEUT. SAFFORD, U. S. N."

"Logs can be obtained from ten to thirty feet long, and twelve to thirty inches square. Special sizes to forty feet, and thirty to thirty-five inches square. Used for cigar boxes principally. The good qualities of Cedar being so well-known need not be commented on. BROWN."

"TREE OF FIRST ORDER.

It grows in Cuba and the Philippines. Trunks grow to thirty-five meters in height and one meter and twenty centimeters in diameter.

COLOR.—Pale red.

TEXTURE.—Soft, somewhat porous; breaks obliquely, without splinters, but unevenly; shaving is large, soft and very much curled.

ODOR.—Fragrant, and when burning emits an odor similar to that of the Juniper. SALVADOR CERON, p. 284."

CALAMANSANAY.

Terminalia Calamansanay, Rolfe.
Terminalia bialata, Vid.
Combretaceæ.

SYNONYMS—Calamansanay, Calamansaun, *Tagalo.*

WHERE FOUND—Islands of Luzon, Masbate and Mindoro.

DESCRIPTION—*First Group.*

"This tree attains a height of thirty meters and sometimes even to a greater one. Color from a white rose to a bright red, and all intermediate shades; is frequently found to be of unequal shades with spots of denser color.

TEXTURE.—Solid, brittle, compressed, pores not well defined, almost imperceptible, inodorous, although when recently cut it sometimes emits an acid smell; generally breaks with longer splinters, although some specimens break with short ones.

It is valuable for many purposes in ordinary construction, and planks sawed from it are in great demand for flooring on account of its fine grain and capacity to take on a fine polish; for this purpose it brings a higher price than other woods. It is rarely brought to Manila; occasionally a few pieces come from Nueva Ecija.

It is common in many provinces.

Señor Cortes made following tests:

LOCALITY	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS	LOCALITY	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS
Bataan	2	1.566	128	0.751	Laguna	2.8	0.912	103	0.416
Bulacan.....	1.8	1.488	179	0.674	Mindoro	1.5	1.520	171.5	0.662

D. VIDAL."

"COLOR.—From a white rose to a bright red, and all intermediate grades; frequently pieces have several shades with bright streaks.

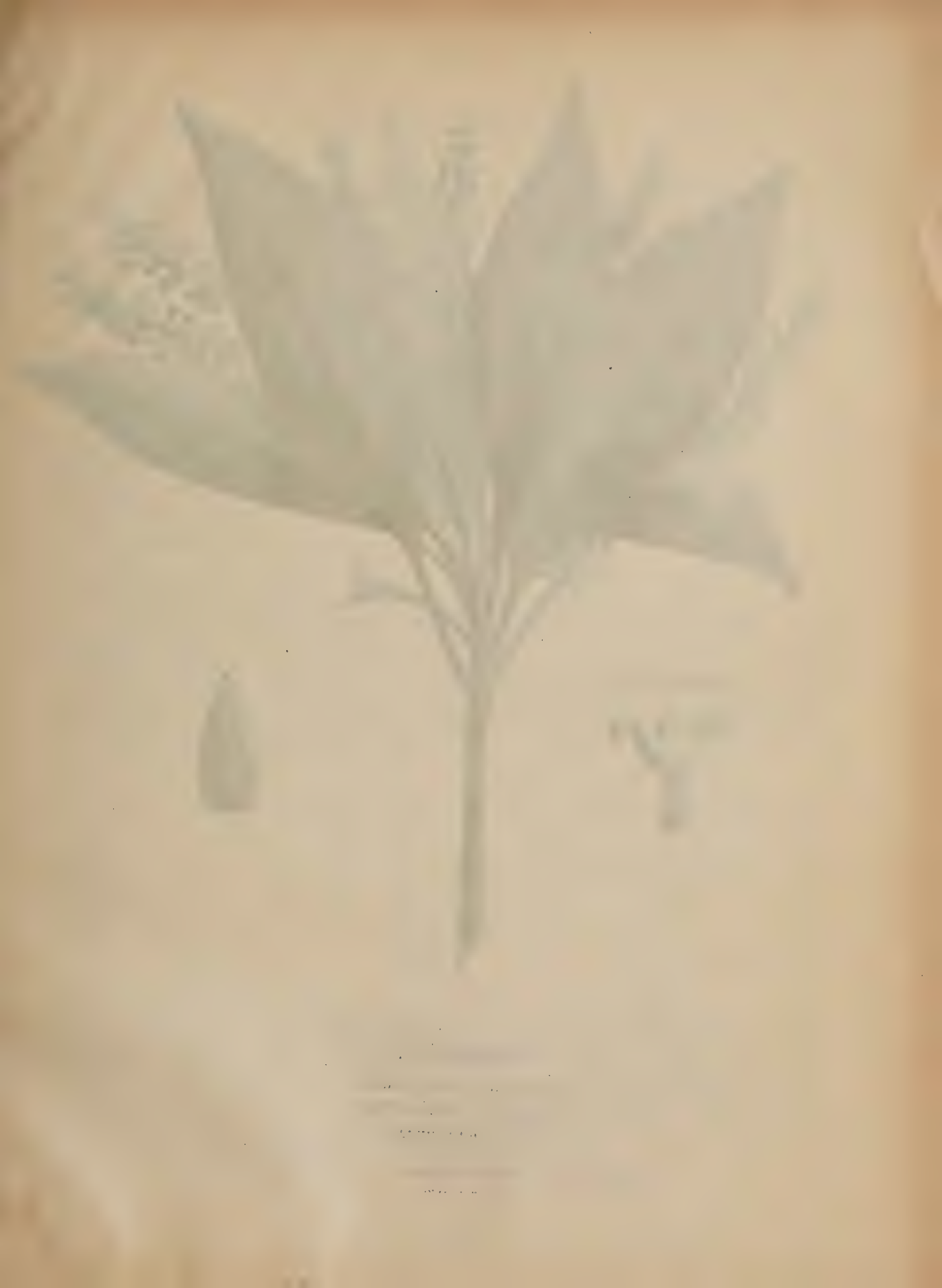
ODOR.—None, although when recently cut it has an acid smell.

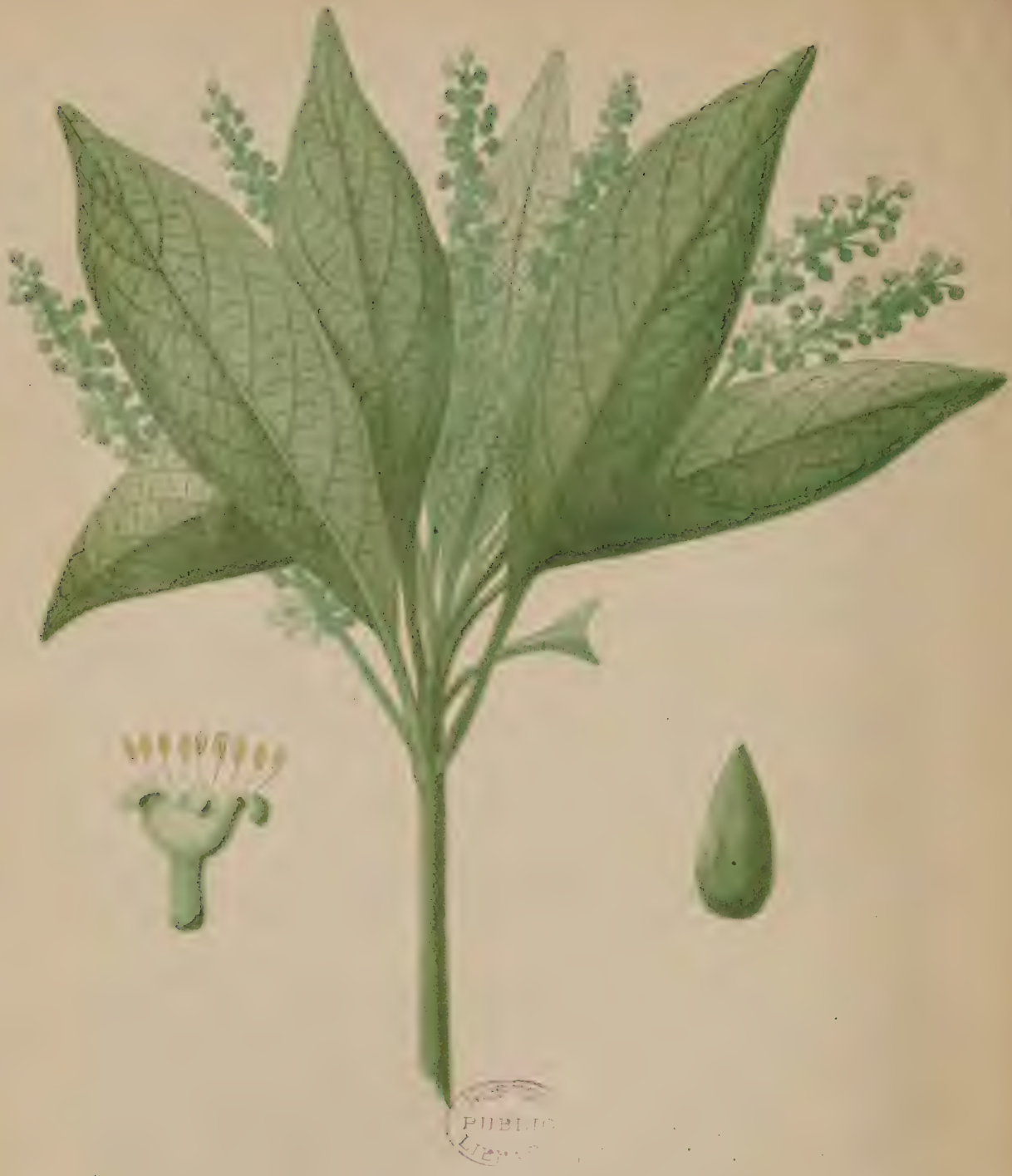
TEXTURE.—Solid, pores not well defined and almost imperceptible; generally breaks in long splinters, sometimes in short ones. It is probably a species of Diospyros. It is useful for various purposes in domestic construction. It is very plentiful in different parts of the Archipelago, as in Tayabas, Nueva Ecija, Bataan, La Laguna, Mindoro, Bulacan, but it never predominates in the forests where it is found.

The mean result from specimens from various provinces is as follows: Elasticity, 0.0037 meters; breaks with a weight of 38.533 kilograms; weight in the air, 9.630 grams, and specific gravity, 0.643. S. VIDAL."

"Leaves bunched at the extremities of the branches, lanceolate, entire and smooth. Petioles short. Flowers hermaphrodite, axillary, growing in spikes. Calyx adherent, small, deciduous, bell-shaped, of one piece, woolly on inside and outside, with five divisions which curve backward. Corolla, none. Stamens, ten, the five alternate, inserted between the divisions of the calyx, and the others on the divisions. Filaments erect and longer than the calyx. Anthers bilocular and opening lengthwise. Ovary, one, with four axles. Style, one, longer than the stamens. Stigma simple and awl-shape. Fruit, nut-like, globular, somewhat compressed, with three or more ribs and two wings, not quite opposite, and with a hard and woody seed closely united by the thin membrane of the nut. Sometimes the nut has no ribs. P. BLANCO."

"TREE OF THE FIRST MAGNITUDE.—Plentiful in various parts of the Philippine Archipelago; its botanical species is not known.





CALUMPIT.

Terminalia edulis, Blanco.
Terminalia belerica, Vid.
Fam. Combretaceæ.

Atlas, Sinopsis, Flora Forestal de Filipinas, S. Vidal, lám. XLVIII, B.
figs. *1, 2, 3.*

COLOR.—All shades of red from dark to very bright, at times with deeper colored spots.

TEXTURE.—Solid, brittle, pores not very well marked, scarcely perceptible; generally breaks in long splinters. Highly prized for ordinary construction. Without odor when dry. SALVADOR CERON, p. 286."

CALUMPIT.

Terminalia edulis, Blanco.
Fam. Combretaceæ.

SYNONYMS—Calumpit, *Tag.* Magtalisay, *Vis.*

WHERE FOUND—Provinces of Bulacan, Camarines, Cavite, Tarlac, Island of Luzon. Island of Mindoro.

DESCRIPTION—*Third Group.*

"TREE OF SECOND ORDER:

COLOR.—Dirty yellow with ash-colored spots, or of a uniform ash color.

TEXTURE.—Filaceous, loose; fibers longitudinal, somewhat brittle; pores numerous, small and well-defined; breaks in long splinters. The bark is used in some localities to dye cotton fabrics a dirty straw color.

The wood is used in ordinary construction for rafters, pillars and pieces called 'sadsaran,' in Visayas; it is also very highly prized for knees of vessels in Iloilo. It is not very durable, and is inferior to Anasep. It is plentiful in many provinces.

Señor Cortes made following tests:

LOCALITY	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS	LOCALITY	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS
Laguna	0.3	.944	216.5	0.437	Mindoro	2.3	.984	185.	0.719
Bataan	1.8	.736	116.	0.423	Negros	2.	1.216	258.	1.093
Nueva Ecija	1.8	.758	185.	0.718	Misamis	0.2	1.872	133.5	0.729
Bulacan	0.3	.656	199.5	0.800					

D. VIDAL."

"Leaves alternate, lanceolate, entire and almost smooth. Male flowers. Calyx divided in five parts, cleft nearly to the base and hairy inside. Corolla, none. Stamens, ten, longer than the calyx. Hermaphrodite flowers Calix fixed on the ovary, cleft in five parts and hairy inside. Filaments much longer than the calyx. Ovary inferior, lanceolate, compressed and crowned with the calyx. Drupe, meaty, oblong, somewhat compressed with the edges curved upwards, rounded at maturity, with the nut hard, fluted, fibrous and containing one seed.

This tree, well known to the Indians, is of the second order. Its bark is used to dye cotton fabrics a dirty dark straw color. Its fruit is edible when it is black. The meat is of a carnation color, and somewhat savory.

BLANCO, p. 265, 2d ed."

CAMAGON.

Diospyros discolor, Willd.
Diospyros embryopteris, Blanco, (App. Fern, p. 127. Rev. Vidal, p. 197.)
Fam. Ebenaceæ.

SYNONYMS—Camagon, Mabolo, Talang, *Tag.* Balatinao, *Ilocano.* Amaga, *Visaya.* Batolinao, *Ibanac.*

WHERE FOUND—Islands of Luzon, Mindanao, Mindoro, Panay and Paragua.

DESCRIPTION—*Superior Group.*

"THIRD ORDER.

COLOR.—Dirty, ashy red.

TEXTURE.—Dense; fibers fine; breaks in short splinters; is of a very slow growth.

Single specimens are found mingled with other species in the forest; seldom in larger groups than two to three; however, as many as seven or eight trees have been found together, but never in larger numbers.

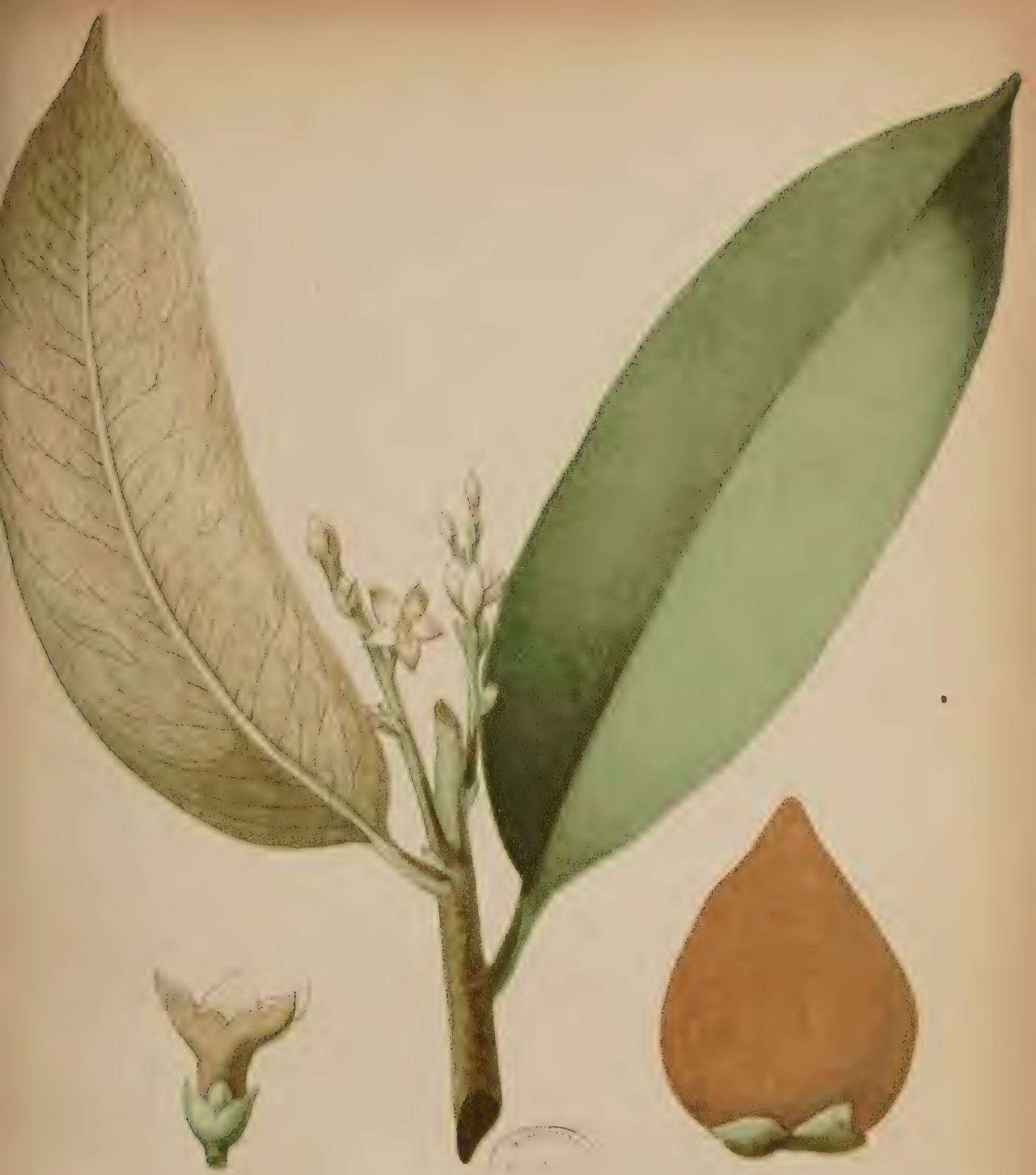
It brings a good price in the market, being worth, in normal times, $1.50 to $2.00 per cubic foot. It is extensively used in making fine furniture and objects of art. R. GARCIA."

"Is procured in roughly rounded logs of nine feet and upward in length and twelve inches in diameter. It is a close-grained, brittle wood, and takes a good polish. Its color is black with yellow streaks, and it is used for furniture making.

CONGRESSIONAL PAMPHLET."

"Got in roughly round logs of nine feet and upwards, and from seven inches to ten or twelve in diameter. BROWN."

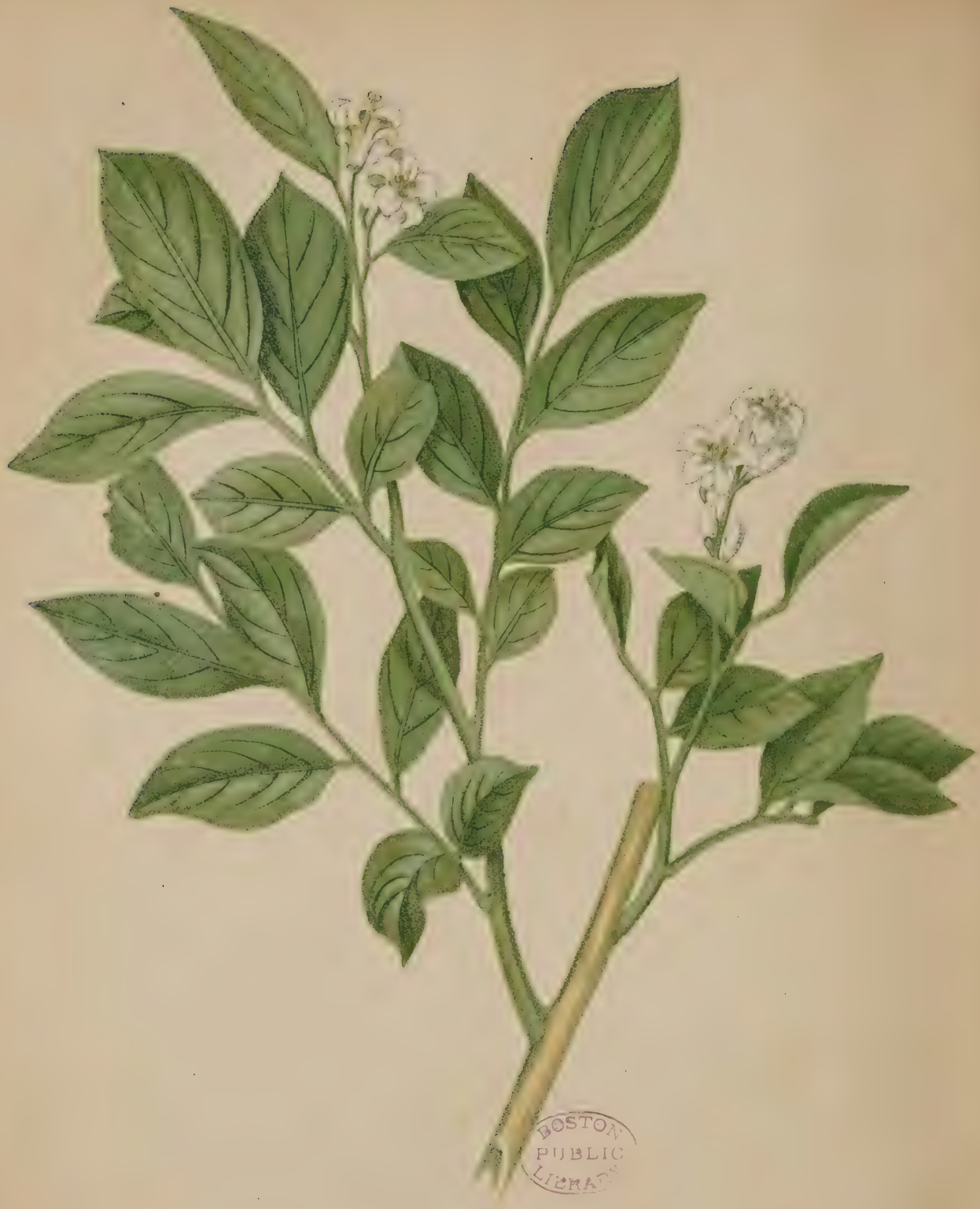
"Leaves alternate, nearly lance-shaped, hairy on the underside, emarginate at the base; in some, two glands at the base and a sharp point at the apex, with two more rows of very small glands underneath, and extending along the sides of the mid-rib. The new leaves are glaucous and downy. Petioles, very short. Axillary flowers, solitary, and terminal ones growing in a spike. Calyx and corolla as described in the genus, four or five cleft. Stamens very much shorter than the corolla, regularly four in number, although sometimes there are five and even ten. Anthers, sessile, arrow-headed, almost as long as the filaments. Ovary



CAMAGON.

Diospyros discolor, Willd.
Diospyros embryopteris, Blanco.
Fam. Ebenaceæ.

Atlas, Sinopsis, Flora Forestal de Filipinas' S. Vidal, lám. LXIII, A.
figs. *1, 2, 6.*



CAMUNING.

Murraya exotica, L.
Connarus santaloïdes, Blanco.
Fam. Rutaceæ.

Atlas, Flora de Filipinas, Blanco, lám. 78.

globular, very large and hairy. Styles, four. Fruit, large, very hairy, with eight or more compartments, and in each an oval seed, convex on the outside, and sharpened by compression of the others, very hard, horn-like, surrounded by a fibrous pulp, that adheres tenaciously to it.

P. BLANCO."

"As in several allied species, the heart-wood of Diospyros discolor is true ebony; dark-colored, hard, heavy and of fine texture. To the same genus belong the Ceylon Calamander wood, the marble wood of the Andaman Islands and the fine black ebonies of Mauritius and Ceylon.

LIEUT. SAFFORD, U. S. N."

"TREE OF SECOND ORDER.

COLOR.—Black, with narrow grayish red or yellowish grain.

TEXTURE.—Solid, fibers longitudinal and compressed, with pores long, narrow, and slightly marked. It polishes well, breaks as if brittle; its shaving is somewhat rough, compact and not curled. It is highly prized in cabinet making on account of its beautiful color and capability of high polish.

SALVADOR CERON, p. 286."

CAMUNING.

Murraya exotica, L. (Not Blanco).
Connarus santalöides, Blanco p. 366, (2d ed. Fern, p. 36.)
Fam. Rutaceæ.

SYNONYMS—Camuning, *Tagalo.* Banasi, *Ilocano.* Camunig, Banati, Malauin.

WHERE FOUND—In almost the entire Archipelago.

DESCRIPTION—*First Group.*

"TREE OF THIRD ORDER.—Generally does not attain a height of more than three or five meters.

COLOR—Clear uniform ochre yellow with undulating grain and gray spots.

TEXTURE—Compact, of considerable hardness and great strength. It is used principally for cabinet purposes. The Moros of Mindanao use it for making hilts for their krisses, and they consider it the most precious wood in their forests. It polishes well.

No tests have been made with this precious wood showing its elasticity, weight, etc.

On account of its small size it is not used in construction. S. VIDAL."

"Trunk without thorns. Leaves alternate ternate. Leaflets narrowly lanceolate, entire, smooth. Flowers axillary, growing in a panicled raceme,

individual peduncles very short. Calyx very minute, five-parted. Corolla fixed upon the receptacle, of five petals, petals erect, concave, somewhat rounded, three-toothed at the apex. Stamens, ten, inserted in the receptacle outside of the nectary equal to the corolla in length; filaments very thick, with oval anthers, three-grooved, beaked. Ovary round upon a round nectary, inside of the flower. Style and stigma very thick, with diaphanous points. Capsule round with a very thin covering, obscurely marked with five lines, two-celled, with solitary round seed, one frequently aborted. DE CANDOLLE."

"Leaves alternate, pinnate with terminal leaflet; leaflets alternate, lanceolate, nearly entire, rigid, glossy, minutely punctate on both surfaces. Flowers white, in short axillary compound racemes. Calyx very small, in one piece, five parted, with the divisions lanceolate. Corolla much larger than the calyx, petals five, lanceolate. Stamens, ten, not quite united at the base; five alternate ones longer than the others. Anthers sessile, regular. Ovary superior, compressed and fixed upon a round base. Style equal to the stamens. Stigma thick, depressed, apparently four angled. Berry fleshy ovate-acute, somewhat curved at the extremity, with one seed having a pubescent leathery covering, the seed may be split into two parts.

The Camuning is true Murraya exotica, but was described by Blanco under the name of Connarus Santaloides. The species described by Blanco as Murray Exotica is the Glycosmis pentaphylla correa. As in many other species of the Aurantiaceæ the flowers of the Camuning are very fragrant, their odor resembling that of a hyacinth or of Triphasia trifoliata, the "Limoncito" of Guam and the Philippines. LIEUT. SAFFORD, U. S. N."

"This tree is well-known and attains a height of twelve feet. It is said its wood when burnt emits a very unpleasant smell. It is hard and clean, and is used for manufacturing chairs, flutes, etc.

An infusion of the herb is excellent with which to rinse the mouth in case of toothache. Its leaves are an inch long.

T. Camuning, Molavin, V. P.

Camunin Banati, Dec. Prod., p. 285, among the doubtful species.

When the flower is dry, the stamens can be separated from each other by hand; in other flowers they are not united to each other but simply close together.

BLANCO, p. 366, 2d ed."

"TREE OF THE SECOND ORDER.

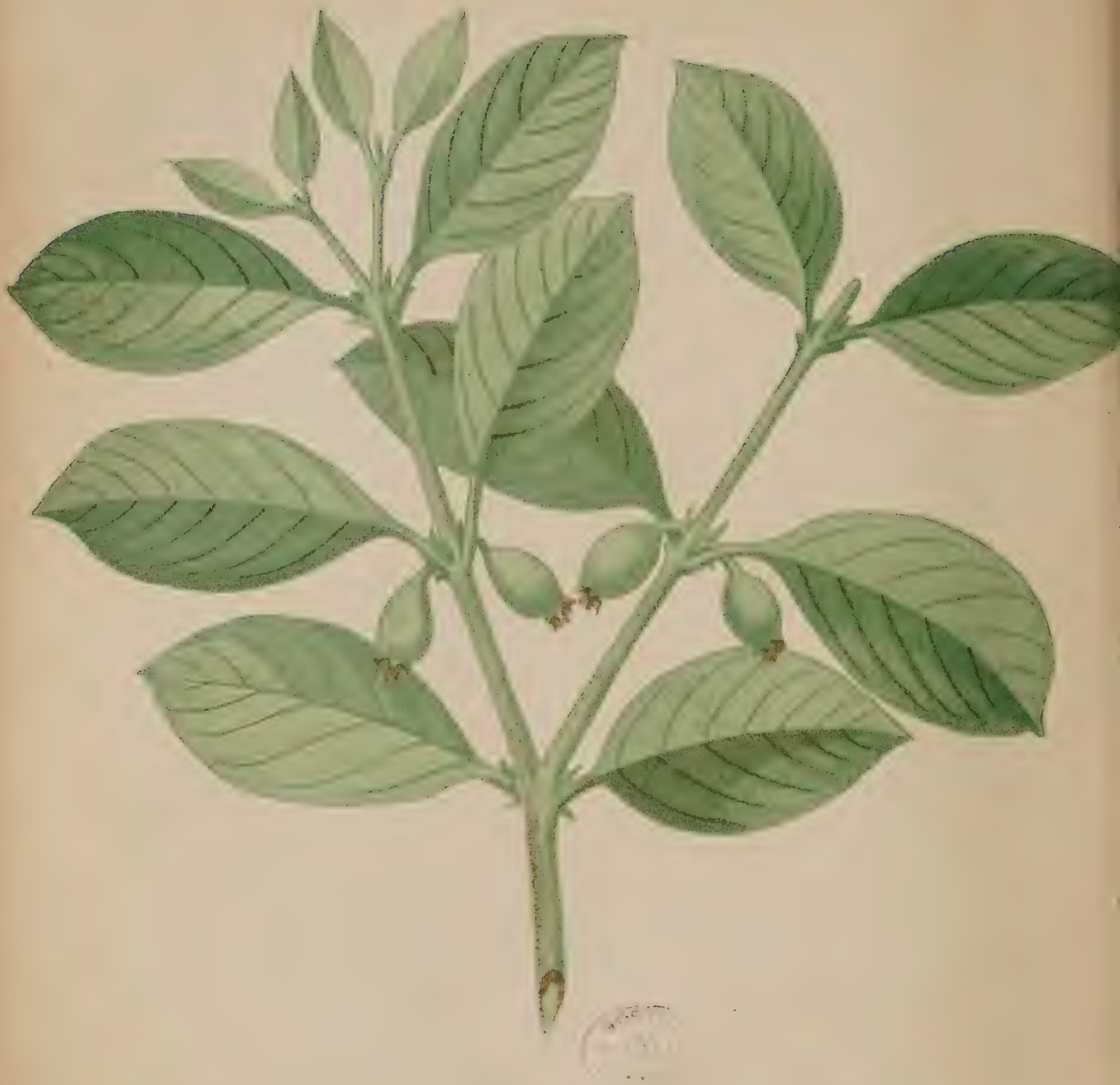
COLOR.—Yellow shaded with clear ochre, uniform or with undulating grain and gray streaks.

TEXTURE.—Very compact, hard and durable.

It is plentiful in some of the islands in the Philippines.

It is principally used in cabinet making; the Moros of Mindanao use it for kriss handles and consider it the best wood in their forests. It polishes well.

SALVADOR CERON, p. 284."



DINGLAS.

Eugenia bracteata, Roxb., var. Roxburghii, Duthie.
Syzygium latifolium, Blanco.

Fam. Myrtaceæ.

DINGLAS.

Eugenia bracteata, Roxb., var. Roxburghii, Duthie.
Sizygium latifolium, Blanco.
Fam. Myrtaceæ.

SYNONYMS—Dinlas, Dinglas, Comintan, *Tag.*

WHERE FOUND—Island of Luzon.

DESCRIPTION—*Third Group.*

"Color.—Grayish or ashy red.

Texture.—Fine, with medium size pores.

Tree of second order according to Blanco, who is doubtful as to the botanical species, yet notwithstanding this, logs of such large dimensions are sometimes seen in the market that justifies the belief that it is of the first order.

The wood is hard, heavy and proof against insects.

It is much used in ordinary and naval construction.

It is not very plentiful, but still it is found in many provinces of the islands, especially in the south of Luzon, (Tayabas, etc.)

I have no data showing its elasticity, strength, weight in the air and specific gravity. S. Vidal."

"Gives logs up to thirty feet by sixteen inches square, occasionally even larger sizes. This will also serve as a substitute for black walnut. It is very strong, hard and durable. Foreman."

"Leaves opposite, lanceolate, smooth and somewhat stiff. Flowers on branches in groups of many flowerlets. Calyx top-shaped with four disfigured teeth. Corolla wanting, unless that it be the cover which envelopes the stamens, composed of eight or nine leaves, joined together at the apices, forming a case, which falls upon the expansion of the flower. Stamens numerous and fixed on the margins of the calyx.

Fruit globular, meaty, crowned with the teeth of the calyx and contains one seed.

Tree of second order, very common in the forests of San José, Batangas, and known as Dinglas, which it appears to be. The wood is white and is used in carpentry. The fruit is purple and edible.

Flowers in February. Blanco, p. 294, 2d ed."

"Is a Tree of the Second Order.—It grows spontaneously in the Philippines.

Color.—Grayish or ashy red.

Texture.—Fine, pores medium; hard, heavy and almost proof against attacks of insects. It is highly prized in ordinary and naval construction.

Salvador Ceron, p. 288."

DITAA.

Alstonia scholaris, R. Br.
Echites scholaris, L., Blanco.
Apocynaceæ.

SYNONYMS—Dita or Ditaa, *Tagalog;* Dallopaven, *Ilocano;* Tanitan, *Visaya;* Andarayon or Oplay, *Cagayan.*

WHERE FOUND—In almost the entire Archipelago.

DESCRIPTION—*Third Group.*

"Tree attains a height of eighteen meters and more.

COLOR.—From white to a red.

TEXTURE.—Is not very strong.

It is employed to a limited extent in ordinary construction but is not wanted in Manila. It is more commonly used in the manufacture of furniture, musical instruments, and small troughs, on account of it being easily worked.

P. Blanco recommends the use of the bark of this species to those persons who cannot obtain quinine.

It is found in many provinces, among which are Tayabas and Leyte.

Sr. Cortes made following test.

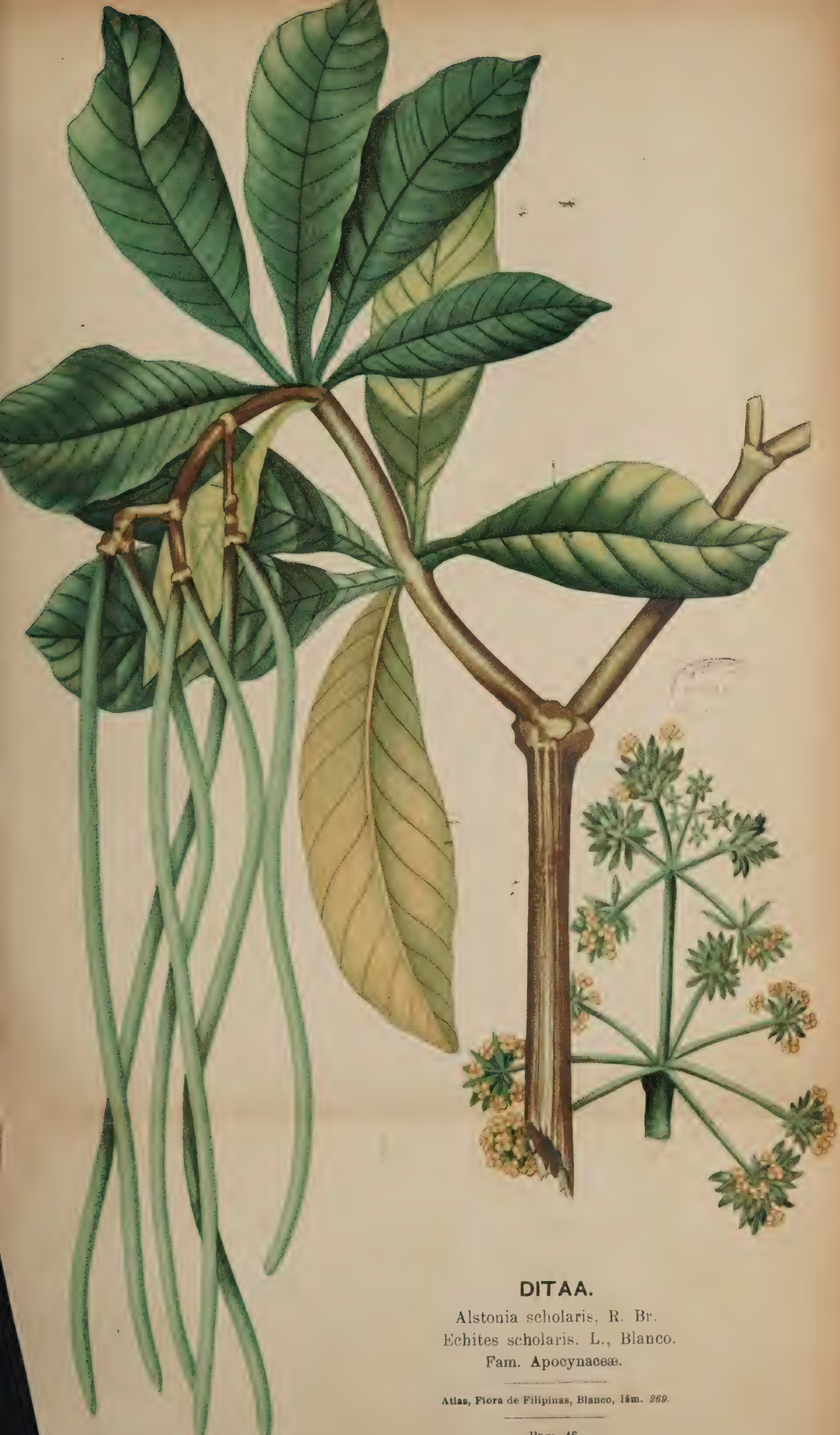
Stretched the specimen 2 lines, breaking it with a weight of 0.864 ounces.

VIDAL."

"A tree belonging to the Apocynaceæ. Trunk covered with small protuberances which look like vestiges of thorns. Branches radiating in whorls, leaves radiating in whorls of 5, 6, or more, nearly elliptical, acuminate at the apex, with short petioles; petioles with a sharp gland on the inner part of the base. Flowers terminal in umbelled racemes. Calyx very short in five parts. Corolla twisted, tubular, corolla limb of 5 nearly round lobes, the throat of the corolla open and surrounded by a downy circle. Stamens 5, concealed within the throat of the corolla and inserted in its tube. Filaments almost absent. Anthers arrow shaped. Style equal to the stamens, somewhat compressed, with a scarcely visible line along its length. Stigma bifid, mounted on a cylindrical zone. Two spirally twisted follicles in which the seeds are arranged in a row not superposed on one another, cylindrical, with pappus at each end.—*Linn.*

Tagalog: "Dita."—*Ilocano:* "Dallopaven."

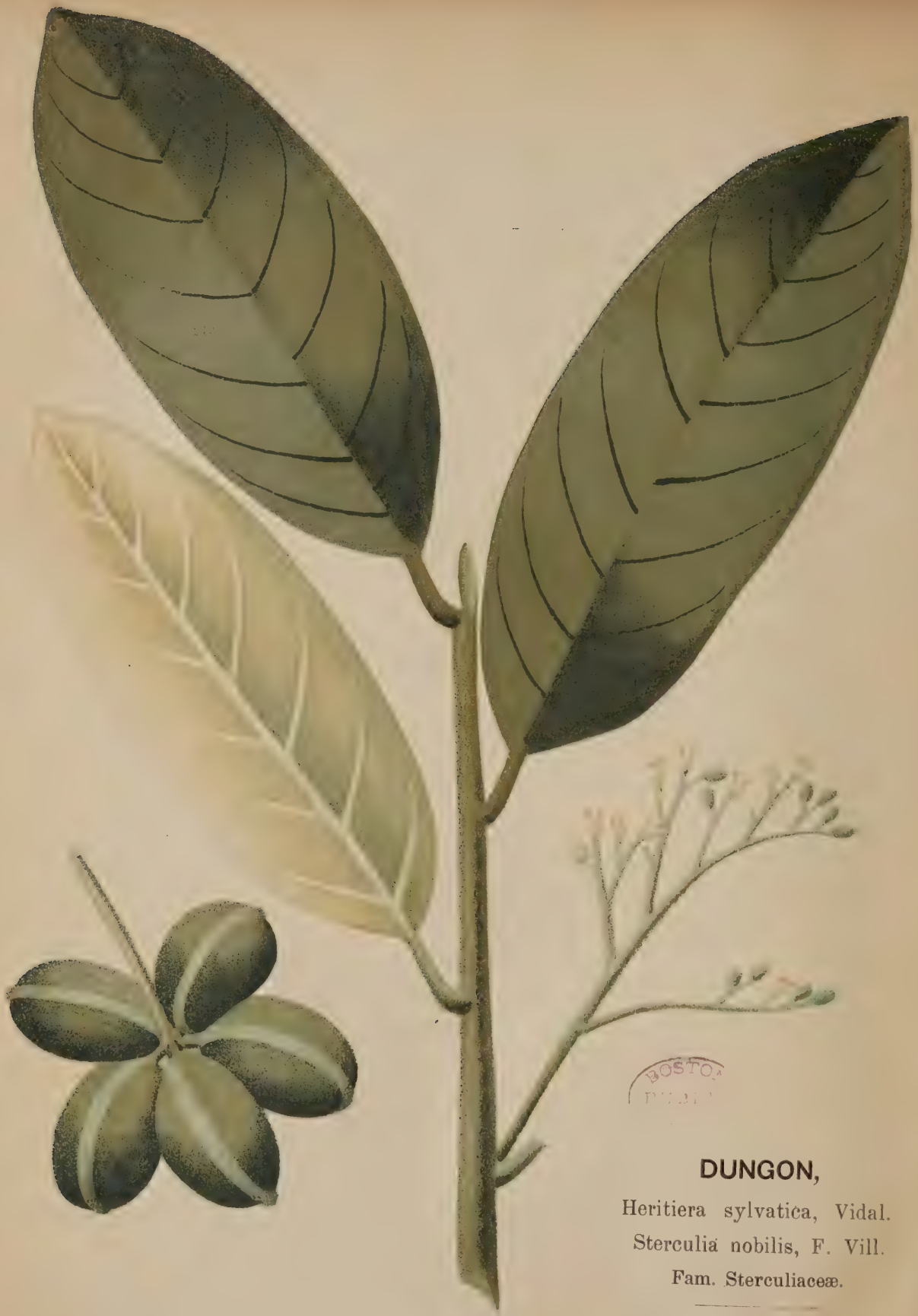
This tree rises in the forests to the height of 18 yards or more. The fruit is more than a foot in length, and a little more than a line in thickness. Its leaves are about five inches long. It is a strange thing that the seeds have pappus at both ends. The flowers are white. If the bark of the tree be wounded, a sticky milk exudes which is very bitter, like the bark. I cannot speak too highly of this valuable tree. It is sufficient to say that it is a perfect substitute for quinine, and is thus a remedy for all kinds of fevers, and as a preventive to the tendency of



DITAA.

Alstonia scholaris, R. Br.
Echites scholaris. L., Blanco.
Fam. Apocynaceæ.

Atlas, Flora de Filipinas, Blanco, lám. *269.*



DUNGON,

Heritiera sylvatica, Vidal.

Sterculia nobilis, F. Vill.

Fam. Sterculiaceæ.

Made from drawing copied from nature by R. García.

corruption in malignant diseases. Some women take the milk as a remedy for the diseases peculiar to their sex. It flowers only in April.

The tree called Tangitang in Iloilo, which has bitter bark, and is much esteemed, scarcely differs in appearance from the Dita, except that the leaves of the former are somewhat downy. BLANCO, p. 77, 2d ed."

DUNGON.

Heritiera silvatica, Vidal.
Sterculia nobilis, F. Vill., Rev. Vidal, p. 66.
Sterculiaceæ.

SYNONYMS—Dungon, Dongon, Dungol, *Tagalo;* Iron wood, *Brown;* Paronapin, Palonapin, Palonapoy, *Ilocano.*

WHERE FOUND—Islands of Luzon, Mindanao, Mindoro and Paragua.

DESCRIPTION—*Superior Group.*

"COLOR.—Purplish red.

ODOR.—Somewhat resembles that of tanned hide.

TEXTURE.—Solid; fibers, compressed and crossed; pores, not very well defined; breaks in short splinters; shavings are united, rough and slightly curled. It is difficult to work. Wood is very hard and resistant to transverse pressure, possessing these properties to a higher degree than any other wood, with the exception of the Yacal of Angat (Bulacan). It lasts well, especially in sea water. It is extensively used in building, and is very highly valued as uprights, sills, joists, dormers, bridge supports, etc. It is also much used in naval construction for the inner supports to keels, connections, oars, anchors, etc. A proof of its hardness is that it is used in the manufacture of cog wheels. Although it is generally of a straight growth, it sometimes has knots which weaken its transverse strength. From these knots there exudes a gum which becomes very hard and renders it very difficult to work, in many cases causing the tools to break. It has a thick layer of soft wood next to the bark, which becomes worm eaten in a few years, thereby weakening at that part. The use of this wood in Manila dates back some fifty years. It abounds in almost all parts of the Archipelago; but in the mountains of Bulacan, Pampanga and Nueva Ecija the supply is very much diminished. The trees grown there at present are undersized.

Señor Cortes made following tests:

LOCALITY	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS	LOCALITY	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS
Bataan	1.5	1.392	244	0.907	Negros	1.1	1.136		
Nueva Ecija	1.8	1.360	242.5	0.940	Leyte	1.	1.272		
Bulacan	1.1	1.712	235	0.929	Misamis	2.2	0.672	256.5	0.941
Mindoro	1.4	0.824	237	0.919					

S. VIDAL."

"Dungon (a variety *Sterculia ambiformis*), grows up to fifty feet long, giving logs up to twenty inches square. It is sometimes called Iron Wood, and is very hard and durable, and specially strong in resisting great transverse pressure, or carrying such weight as a heavy roof. CONGRESSIONAL PAMPHLET."

"In general appearance the Dungon of the Philippine forests resembles its congener the Dungon-late *(Heritiera littoralis)* of the sea shore, a tree of very wide distribution in the tropics. Both have brownish green coriaceous leaves with the lower surface conspicuously whitish, so that they are readily distinguished from their neighbors. The wood, however, of the *H. silvatica* is harder, stronger, and finer than that of the *H. littoralis*, and the trunks of the forest tree consist almost entirely of heart-wood, while those of the shore species have a thick envelope of soft, useless wood inside of the bark.

These species are allied to the Sunder tree, the valuable dark wood of which is used for boats, bridges, and house-building in India, and to the *Heritiera macrophylla*, or looking-glass tree, of Burma. LIEUT. SAFFORD, U. S. N."

"The Dungon is from twenty-two to thirty-six feet long and from twelve to eighteen inches square. Special sizes to fifty feet, and eighteen to twenty inches square. Sometimes called Iron Wood. Very hard, tough and durable; and specially adapted for resisting great transverse pressure, or weight, such as carrying a heavy roof, etc. Used for keels, on account of its great strength; does not resist the sea worm; applied at Manila for all purposes where more than ordinary strength is required, when Molave cannot be got in sufficiently long lengths and Ipil is unattainable. BROWN."

"Tree of regular height, smooth bark and hard wood, which grows in mountainous places. Leaves obtuse-acuminate at the base, elliptical oblong-acuminate, from seven to twelve centimeters long by twenty-five to fifty millimeters wide, leathery, lustrous, dark color on the upper side, and light underneath, even when dry. S. VIDAL."

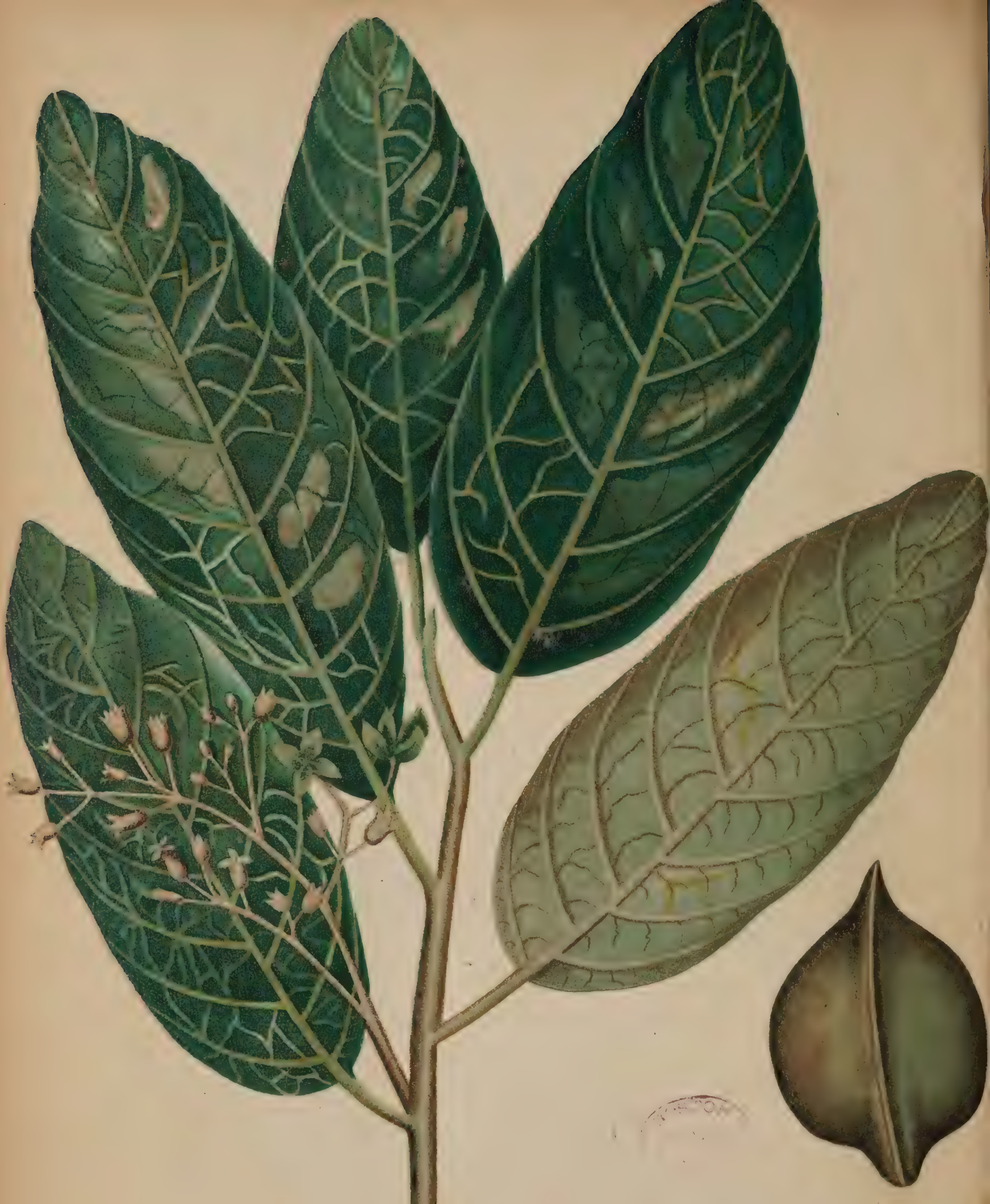
"TREE OF THE FIRST MAGNITUDE.—Is plentiful in almost all the Philippine Archipelago.

COLOR.—Livid red.

TEXTURE.—Solid, with fibers compressed and crossed; pores scarcely visible.

ODOR.—Similar to that of tanned hide; breaks in splinters and as if brittle; the shaving is united, rough and very little curled. It is easily worked and of great durability. It is used very much in ordinary and naval construction and highly prized for posts, pillars, beams, joists, bridge timbers, keels, etc.

SALVADOR CERON, page 288."



DUNGON-LATE.

Heritiera littoralis, Dryand.
Sterculia cymbiformis, Blanco.
Fam. Sterculiaceæ.

DUNGON-LATE.

Heriteria littoralis, Dryand.
Sterculia cymbiformis, Blanco.
Sterculiaceæ.

WHERE FOUND—Islands of Luzon, Mindanao and Panay.

DESCRIPTION—*Second Group.*

"Leaves alternate, somewhat heart-shaped, oblong, somewhat emarginate, and of a whitish color on the under side.

Petioles short, swollen at the extremities; calyx, somewhat cruet-shaped, with four or five teeth; corolla, none; more than thirty stamens; filaments, few, which support sometimes two, sometimes three anthers. Nectary, ten glands, placed two by two in the base of the angles of the ovary. Ovaries superior, conical, with five angles; style short and thick; stigma with five lobes. Fruit, like a legume, with the envelope bony and fibrous; oval, compressed at the sutures, with part of shell protruding on the side, containing one seed. There are five ovaries and drupes and some of them abort.

See General Appendix, Byttneriaceæ. Tree of second order; is very well known. It is of a half violet color and is strong and heavy; some gum exudes from it; and although it is not very hard, it is excellent for presses, and is appropriate for all those purposes for which a hard and brittle wood cannot be used. It is said that it lasts well in sea water. Its fruit, larger than walnuts, are perhaps those which Padre Delgado says must be prepared before eating.

It flowers in March and also in December.

It would appear that the *Helicteres apetala* of Juss. belongs here, but the Dungon is not of this genus. There are some trees which bear only male, and others only female flowers.

Trees bearing male flowers: leaves oviform, oblong, not denticulated at base, almost straight on edges and with white down on under side. Flowers axillary growing in a compound raceme, deciduous. Calyx cylindrical with five teeth, downy on inside and outside, soft and pulpy. Corolla none. An elevated disc in center of flower, cup-shaped with the edges covered with a great number of small glands. Anthers about ten, more or less fertile, growing upon an arch. It has five styles at end of arch. No fruit.

I have seen in Parañaque trees of about the thickness of a man's thigh. The leaves are about five inches in length. The calyxes are of a violet color, similar to those of the Calumpang; from this and the arch on which the anthers grow, it can be seen they belong to the same genus. All the flowers fall. The natives call it Dungon.

Trees bearing female flowers: leaves, heart-shaped, oviform, somewhat denticulated and white underneath. Flowers grow in racemes. Calyx cylindrical with five teeth, downy on the inside. Corolla none. Stamens none. Pistils exactly as above described.

Among the flowers of these trees I have seen many with the fruit small and ripe. They have five ovaries growing in an arch, some of which abort. There are two glands at the base of each ovary; these are straight and not spiral, oval, compressed, close together by the flat side, next the lower suture. They have a wing which wraps around it from above to below, following behind, where it is wider, which gives it the appearance of a keel of a small vessel. It has five styles, and the stigmas are thick. From this fact I named the species. The Dungon should be included with *Sterculia*, but it is not the *Sterculia Helicteres* of de Candolle, but distinct. BLANCO, p. 526, 2d ed."

EBONY.

Maba buxifolia, Pers.
Diospyros nigra, Congressional Pamphlet.
Ebenaceæ.

SYNONYMS—Ebony, *English;* Ebano, *Spanish;* Luyong, *Tagalog;* Bantolinao, *Visaya.*

WHERE FOUND—Islands of Luzon (Province of Zambales), Mindanao, Paragua, Samar.

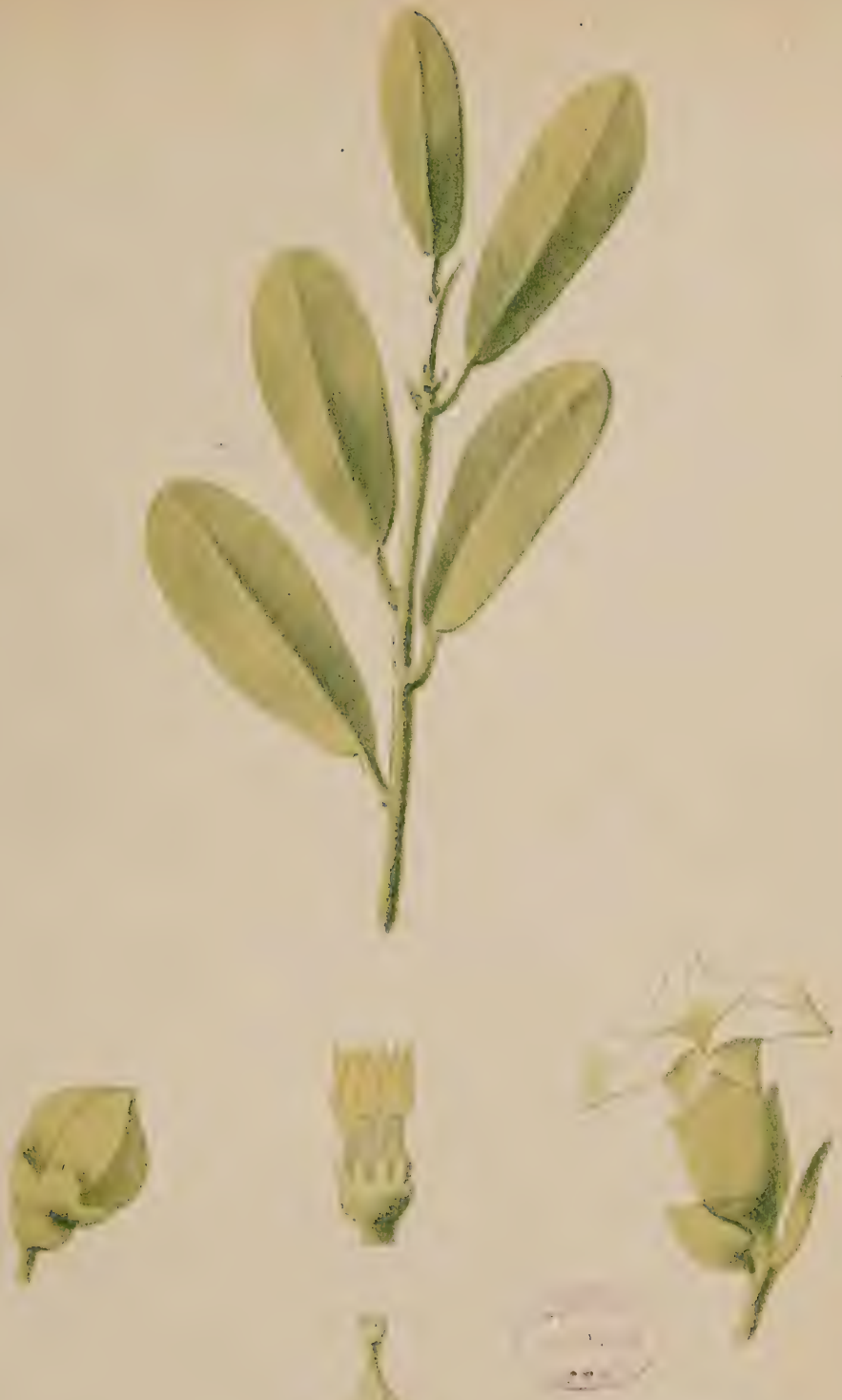
DESCRIPTION—*Superior Group.*

"COLOR.—Sap wood, ashy; heart-wood, black.
TEXTURE.—Dense.
Trees are of small dimensions and are generally found in groups, occasionally alone, intermingled with other species. Its growth is very slow, a tree of 0.25 meters in diameter being seventy or eighty years old; black-wood (heart-wood), 8 centimeters in diameter, is about the largest that can be obtained.
R. GARCIA."

"This wood is found in limited quantities in the Philippines.
CONGRESSIONAL PAMPHLET."

"The natives of Visayas call ebony (bantalinao) a precious wood, which serves more for ornaments than for utility, growing abundantly in their islets and sea coasts.

It is very highly valued in foreign parts, but where it abounds it has little value, as it is not employed in any kind of construction. It is of spontaneous growth, requiring no planting nor cultivation; and on account of its black color, brings a very high price in Europe. It is an exceedingly hard wood, and can be worked and polished only by the use of very sharp instruments.



EBONY.

Maba buxifolia, Pers.

Diospyros nigra, Congressional pamphlet.

Fam. Ebenaceæ.

Atlas, Sinopsis, Flora Forestal de Filipinas, S. Vidal, lám. LXIII, H. figs. *1, 2, 3, 5.*

It is worked in Europe with great skill, and it is principally used for picture and looking-glass frames, head pieces for beds, inlaid work on desks, etc. It is rare to find a tree .8 meters to 1.2 meters in diameter. Boards for tables or other purposes cannot be made from it. On the outside of its bark there is always found a fungous growth; it is necessary to remove this as only the body of the tree is of value. So great is the quantity of this wood on the islets and promontories of the Philippines, especially in Bohol, and the Islands of Biri near to Palapag, that the Indians cut and sell it for twenty-five cents for each pico (twenty-five pounds), and the collectors of the royal tribute receive it, and sell it to the Chinese mestizos at a higher price. Thus it is, the further it goes from its native place, the more it increases in value, until it finally becomes worth almost its weight in silver.

The ebony bears an edible fruit, sweet and savory, similar to a sweet lemon.

DELGADO."

"It is also found in very limited quantities. FOREMAN."

"New branches downy. Leaves alternate, cuneate from the base, obovate, leathery, smooth, thickened at the margin, four to five centimeters long, one and one-half centimeters wide. Petiole short, one centimeter long and generally curved.

Axillary flowers nearly sissile, the male often three together, the female solitary. Calyx hairy, bell-shaped, divided into three parts. Lobes ovate, and sharp at extremity. Corolla tubular, divided in three lobes.

Stamens six, which are inside the tube of the corolla, same length as anthers, with alternate glands situated inside the calyx. Ovary ovate, of three lobes with the style and stigma open, five to seven seeds. PERSOON."

"This species is of wide distribution. It is sometimes called 'East Indian Satin Wood,' and is much valued for inlaying. Allied species occur in Polynesia, some of them bearing edible fruit resembling the persimmon.

LIEUT. SAFFORD, U. S. N."

"IS A TREE OF THE SECOND ORDER.—Grows in Cuba and the Philippines.

COLOR—Sap-wood, whitish; heart-wood, black, with gray or yellow grain.

TEXTURE—Heavy, compact, hard, brittle, and breaks obliquely in splinters and fibers; its shaving is short, rough and little curled. Differs from Camagon in that its black color is more pronounced. Is used for sabre handles and inlaid work on fine articles and furniture. SALVADOR CERON, p. 288."

GUIJO.

Shorea Guiso, Blume.
Dipterocarpus Guiso, Blanco.
Dipterocarpeæ.

SYNONYMS—Guijo, Guiso, Yamban, *Pampanga;* Guisoc.

WHERE FOUND—Islands of Bohol, Cebú, Leyte, Luzon, Mindanao, Mindoro, Negros, Panay, Romblon, Samar.

DESCRIPTION—*Second Group.*

"First Order.

Color.—Light or ashy red.

Texture.—Fibers, undulating, strong and flexible, with many well defined; pores; the medullary rays of first order, are wide, extended and the secondary, fine and close together, all plainly visible. It is prized in ordinary and naval construction, and also by carriage and cart makers for wheels. There are a great many varieties, based on the differences in the woods, which I will not attempt to describe for want of data.

The following is the mean result of tests made: Elasticity 0.0035 m.; broke with weight of 40.7469 kilograms; weight in the air 9.73 grams, and specific gravity 0.685.

The maximum resistance given appears to me to be exaggerated, when compared with stronger woods, as the Dongol, for instance. S. Vidal."

"First Order.

It is plentiful in almost all the islands, especially in those in the south of the Archipelago.

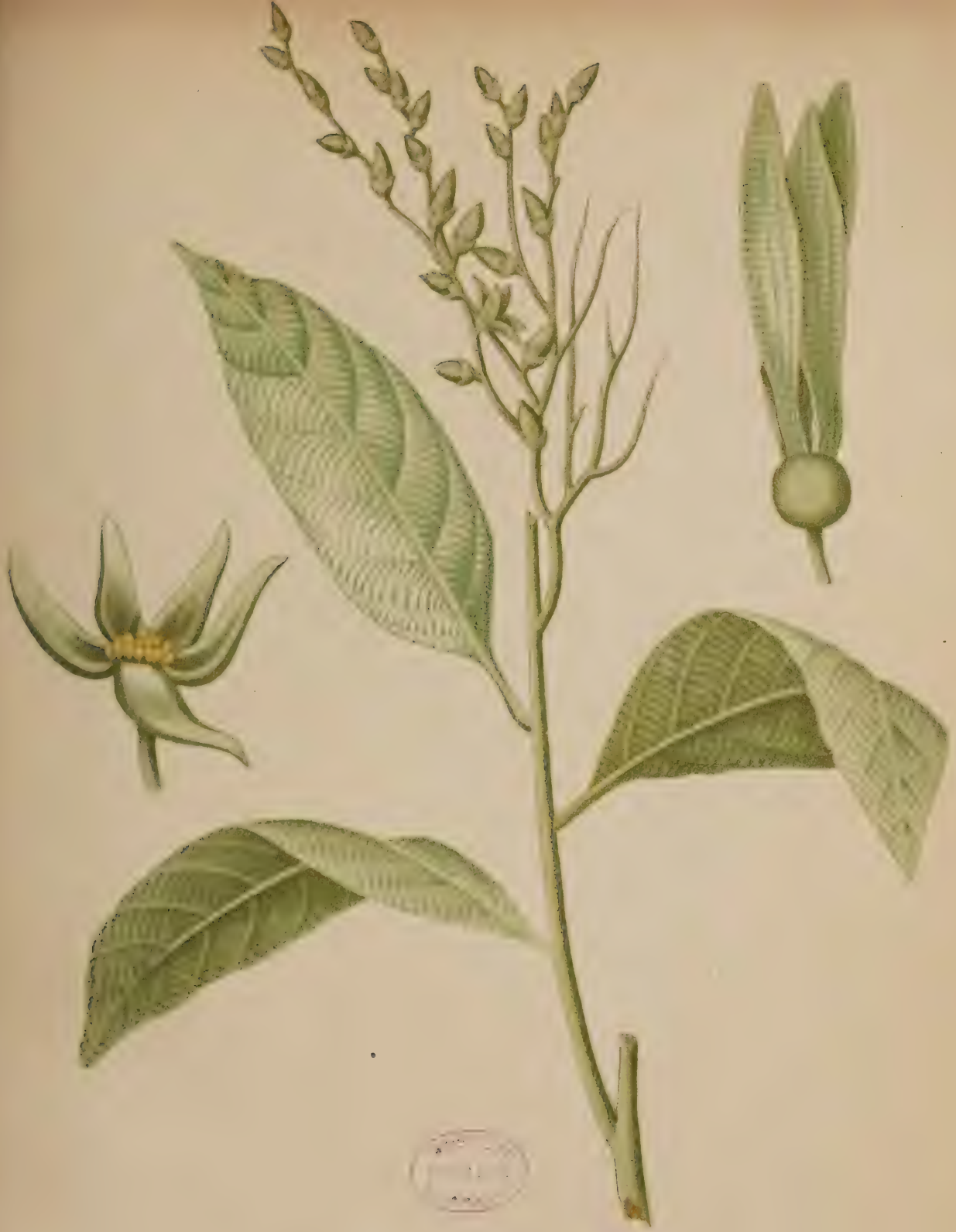
There is a demand for this wood in the markets of China.

Señor Cortes made following tests:

ORIGIN	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS	ORIGIN	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS
Cavite.....	1	1.524	189.	0.673	Bataan.....	1	1.808	202.5	0.823

D. Vidal."

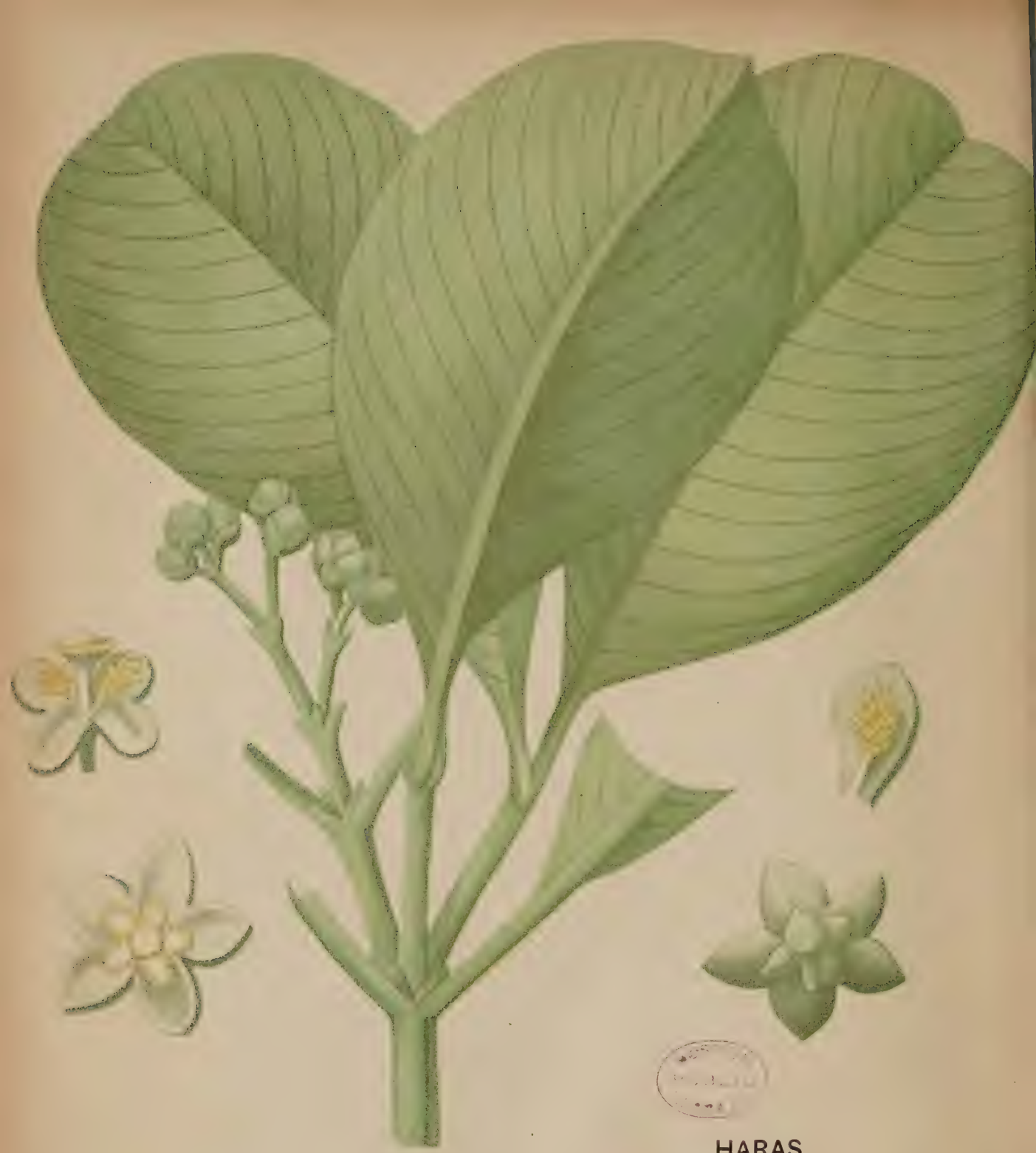
"Gives logs up to seventy-five feet long by twenty-four inches square; is very strong, tough and elastic. In Manila this wood is invariably used for carriage wheels and shafts. In Hongkong it is used for wharf decks or flooring, amongst other purposes. Foreman."



GUIJO.

Shorea Guiso, Blume.
Dipterocarpus Guiso, Blanco.
Fam. Dipterocarpeæ.

Copied from nature by R. García.



HARAS.

Garcinia Cowa, Roxb.

Cambogia crassifolia, Blanco.

Fam. Guttiferæ.

Atlas, Sinopsis, Flora Forestal de Filipinas, S. Vidal, lám. XI, A. figs. *1, 2, 3, 4, 5.*

"Branches black. Leaves alternate, ovate, elongated, entire, smooth, stiff, the veins prominent underneath. Petioles very short. Flowers in panicles of few flowerlets. Calyx, corolla, stamens, pistils and other parts the same as in Dipterocarpus plagatus. The calyx at maturity is adherent and crowns the fruit. The parts of the calyx or wings are narrower than in that species and three or four of them are long. See General Appendix—Dipterocarpeas.

TREE OF SECOND ORDER.

Very highly prized on account of the hardness and flexibility of the wood; it is much used for carriage wheels, for masts and keels of vessels, especially the yellow Guijo; but the Bayante catapan and guisihan are preferred. The Indians call this tree Guiso, and the Spaniards, improperly, Guijo. It is common in Mindoro in the forests of San Mateo. Flowers in June. BLANCO."

"TREE OF THE FIRST MAGNITUDE.—Abounds in almost all the islands of the Philippine Archipelago.

COLOR.—Clear red or ashy red.

TEXTURE.—Fibers undulating, strong and flexible, with numerous and well-defined pores; medullary rays of first order wide and spacious, the secondary ones fine and close together; all of them plainly visible. The wood of the Guijo is highly prized in ordinary and naval construction; it is also used for making carts and for artillery wagons. SALVADOR CERON, p. 290."

HARAS.

Garcinia Cowa, Roxb.
Guttiferæ.

SYNONYMS—Haras, Jara, *Tagalog*; Sadugan, *Visaya.*

WHERE FOUND—Visayas Islands.

DESCRIPTION—*First Group.*

"COLOR.—Yellowish, canary.

TEXTURE.—Very dense and very hard; fibers fine.

Trees of five meters in height, fifteen centimeters in diameter. Leaves in pairs and stiff. A joint at extremity of petiole. Bark milky.

From a specimen received from the province of Antique for the Filipino exposition in Madrid, and from descriptions given by natives of that province, we have been enabled to ascertain its genus. R. GARCIA."

CAMBOGIA CRASSIFOLIA.

"Leaves opposite, between oval and lanceolate, with many small veins approaching the apex, entire, smooth and meaty. Petioles wanting.

Trees larger than the human body, found in the Visayas. The leaves are three inches long and not quite one inch in width. They are meaty and are thus distinguished from others of the same genus which are found in the islands. The Guta Gamba which exudes from them has an agreeable odor and burns well when ignited. I do not know whether its properties are similar to those of other trees.

This appears very inferior and the color clearer. I have not seen its flowers.

In Cebu it is called Sadugan. It is a new species.

BLANCO, p. 304, 2d ed."

IPIL.

Afzelia bijuga, A. Gray.
Eperua decandra, Blanco.
Leguminosæ.

SYNONYMS—Ipil, *Visayan;* Ipil, Taal, *Tagalog*; Ifil, *Island of Guam;* Ifi-lele, *Samoa.*

WHERE FOUND—Island of Luzon, Masbate, Mindanao, Mindoro, Panay, Paragua, Romblon, Samar.

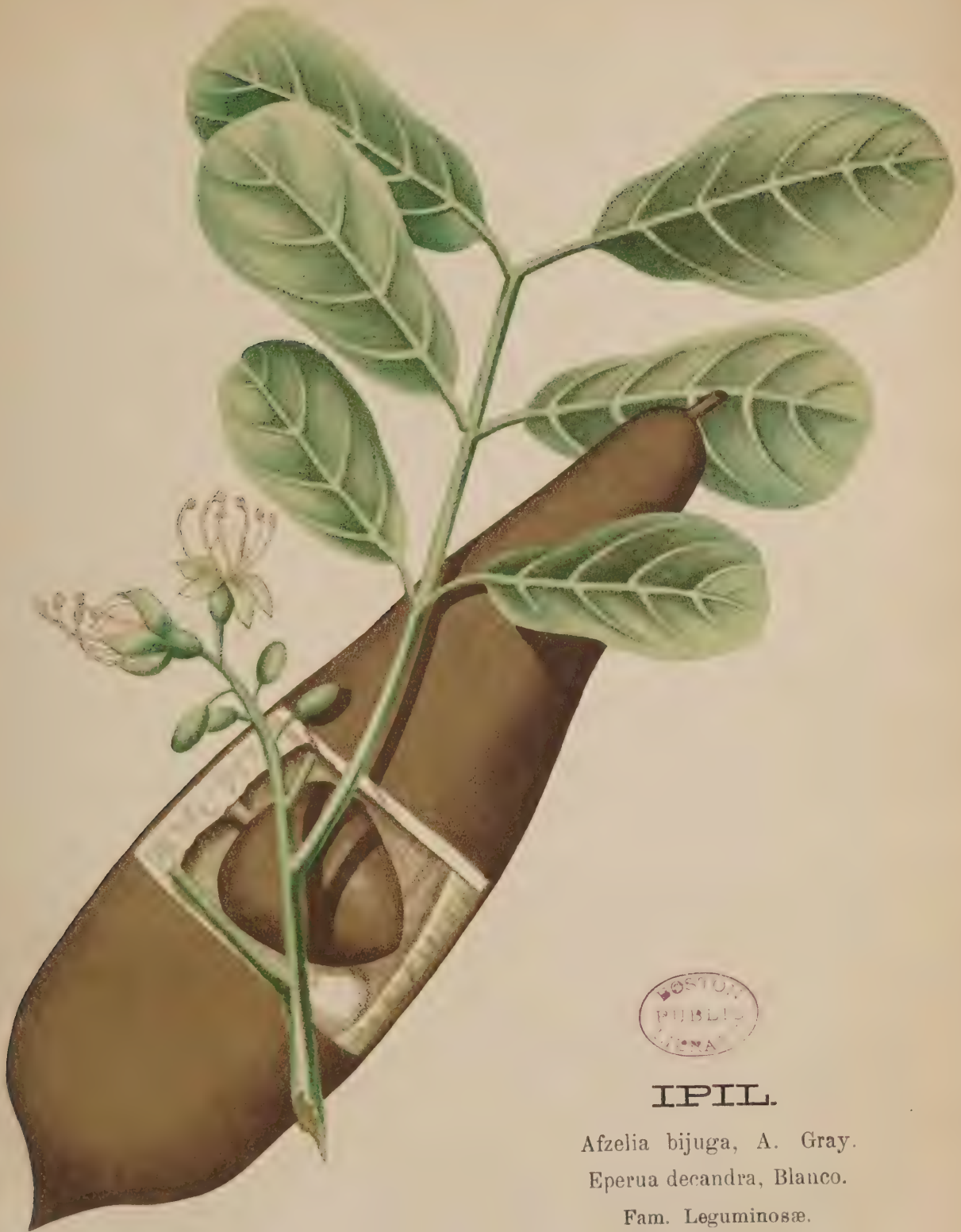
DESCRIPTION—*Superior Group.*

"COLOR.—Sap wood is always white when tree is cut.

Heart-wood: canary yellow when wood is perfect and recently cut. Upon exposure to the air it changes to chocolate color. The wood of old trees (and occasionally that of young trees which have been cut for a long time) changes and has a color varying from a purple to black, resembling ebony. This color is more frequently observed in pieces used as uprights, which have been for some time in the ground. When it acquires this color it is almost impervious to decay, and is of great durability. Pieces which have been in use a century show no deterioration.

ODOR.—Agreeable and not very pronounced.

TEXTURE.—Strong; the pores are like long curved cracks and strongly defined in longitudinal sections. The fibers transverse and compressed; breaks into short splinters; shavings are rough and very much curled. It is valued for its excellent qualities for general construction. When grown on high ground it is perhaps the best quality of timber in the islands, and used preferably in framing. It is impervious to the attacks of the anay, and to the decay produced by contact with the earth, also to the caustic action of lime. It is very abundant in the



IPIL.

Afzelia bijuga, A. Gray.

Eperua decandra, Blanco.

Fam. Leguminosæ.

Atlas, Sinopsis, Flora Forestal de Filipinas, S. Vidal, lâm. XLII,

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Archipelago; and that from the islands of Masbate and Sibuyan is highly valued in the market; that of Tayabas, although scarce, is not inferior in quality when well selected.

Pieces have been cut in the Island of Tablas ten meters long and .60 m. in thickness.

This timber, when grown in low lands, loses much of its good qualities. In China, sometimes, the Supa is passed off as Ipil, and is given the name of Ipil Negro.

Señor Cortes made following tests:

LOCALITY	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS	LOCALITY	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS
Misamis.....	1.2	1.824	225.	0.838	Negros.....	1.	1.616	216.	0.797
Mindoro.....	1.2	1.234	189.	0.724	Leyte.....	1.5	1.538		

S. VIDAL."

"Wood very excellent and similar to the Tindalo or Barnion. It does not grow in the forests, but on the beach or in close proximity to the sea. The trees are very large and thick, and the wood at time of working has a dark yellow color; but this changes after a short time to a dark red color. It is easily worked when newly cut, but after a time it becomes hard and is difficult to work. It is found in the Visayan Islands only. I have not seen it in the Tagal Islands, although it might be carried there for some special use. The doors of the church in the town of San Mateo are made of this wood brought from the Visayan Islands. It is almost imperishable, and impervious to the action of the weather.

Its only enemies are fire and an ant known as the anay, an insect indigenous to this country. This ant forms his habitation in the ground, and comes out to look for food, traveling in a covered road, like a sheath, which it goes on constructing until it reaches something upon which to feed. It is capable of destroying a warehouse of dry goods in a short time; it is very fond of this wood and of others on account of having a flavor agreeable to its palate. If it did not have this enemy it would not be subject to deterioration, as the sun and air would never damage nor injure it.

It is very commonly used in the construction of houses in the Visayas, being used for sills, braces, boards, and in other ways. It can be put to all the uses mentioned in respect to Tindalo, which is very similar to it, although somewhat heavier. DELGADO."

"Gives logs up to fifty feet long by twenty-six inches square. It has all the good qualities of Molave, except resistance to sea worm, in which respect it is the same as Teak, and may be as much relied on for duration under ground. For sleepers it equals Molave. CONGRESSIONAL PAMPHLET."

"Leaves opposite, without the odd one at the end of the petiole. Leaflets ovate, smooth. Petioles of leaflets very short and puffed. Flowers in panicles. Individual peduncles, long. Calyx tubular with four divisions; divisions of calyx curving downward. Corolla on one side of the calyx, of one petal, the upper part broadened, and with a claw at the base. Ten stamens fixed in the calyx, and downy on the lower part. The three longer ones have anthers; the seven others very short, without anthers. Pistil longer than the stamens. Ovary with small pedicel supporting it. Legume as in figure. P. BLANCO."

"FIRST ORDER.—Grand.

COLOR.—Pale, and not red like the Balayon with which the Indians generally confound it; with time it changes to a black color like the walnut of Europe.

It is a wood well known and highly prized. Its hardness, weight and other properties are similar to the Tindalo.

GENERAL APPENDIX FLORA DE FILIPINAS."

"The Ipil is of very wide distribution. On the Island of Guam the floors of the best houses are made of it; and owing to its durability under ground it is used for 'harigues,' or posts. The pillars of the church of Agana are the trunks of huge 'Ipil' trees which were cut more than a century ago near the site of the building. It is constantly becoming scarcer in that island, and steps should be taken for its preservation.

The handsomely polished kara bowls of the Samoans are carved from sections of this tree, and on account of the weight and hardness of the wood, the Samoans make their best war clubs of it. They call it 'Ifi-lele.'

LIEUT. SAFFORD, U. S. N."

"From eighteen to thirty-five feet long and twelve to twenty-two inches square. Special lengths forty-five to fifty feet and twenty-six inches square. Has all the good qualities of Molave except resistance to sea worm (in which respect it is the same as Teak), and may equally be relied on for duration in ground, or where it is in contact with mortar or cement, and for railway sleepers, for which purposes it is equal to Molave. BROWN."

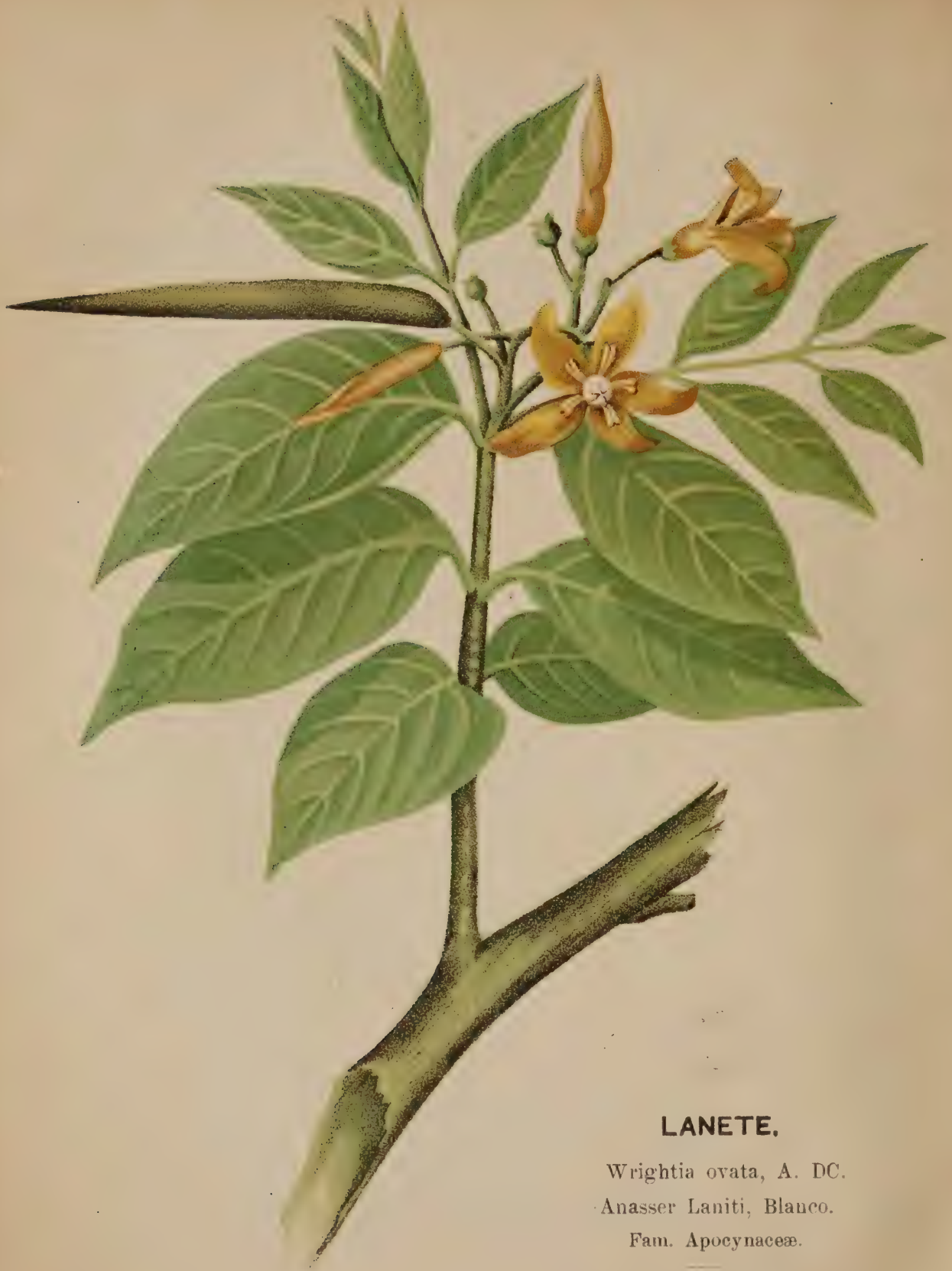
"TREE OF FIRST MAGNITUDE.

COLOR.—Usually dark red, sometimes a yellow ochre.

TEXTURE.—Fiber is transverse and compressed, strong; pores long and well defined; on planed surfaces of planks are many small curved crevices. Breaks in short splinters; shaving is very rough and curled.

ODOR.—Agreeable and not very pronounced.

This tree grows in the Philippine Archipelago, especially in Masbate, Tayabas and Tablas.



LANETE.

Wrightia ovata, A. DC.

Anasser Laniti, Blanco.

Fam. Apocynaceæ.

Atlas, Flora de Filipinas, Blanco, lám. 275.

This wood is much esteemed for its excellent qualities; it is very suitable for naval construction.

The English ship cargoes to China for the arsenals at Hongkong and Shanghai; there is a good demand for it in those markets. This is one of the woods necessary to know well in order to prevent substitution of Supa and Balao for it.

SALVADOR CERON, p. 292."

LANETE.

Wrightia ovata, A. DC.
Apocinaceæ.

SYNONYMS—Lanete, *Tagalog;* Laniti, Loniti, Lanaton, Lanuti, *Ilocano;* Lanusi, *Ibanac;* Tiguig, Tanghas, *Visaya.*

WHERE FOUND—Islands of Cebú, Leyte, Luzon, Mindoro, Negros and Panay.

DESCRIPTION—*First Group.*

"Trees attain a height of eighteen meters and more.

COLOR.—White to reddish.

The wood is not very strong. It is used in domestic construction, but there is no demand for it in Manila; is more generally used in the manufacture of furniture, musical instruments and bateas, being easy to work.

Padre Blanco recommends it as a substitute for quinine. It is found in Tayabas and Leyte, and various other provinces. Señor Cortés obtained an elongation of two lines and specimens broke with a weight of 0.864 ounces.

D. VIDAL."

"COLOR—White.

TEXTURE—Soft and easily worked. Is a useful wood and should be cut during the last quarter of the moon, as should all trees, in order to increase their durability and prevent them from being worm-eaten. It is prized more particularly in the manufacture of chairs, trunks, boxes, wardrobes, etc.; being of soft texture it cannot resist exposure to climate. Great care must be taken with articles manufactured from it to preserve them from destruction by the anay.

The trees called Tiguig in Cebu and Tanghas in Leyte are very similar to the Lanete and answer the same purpose. Is principally used for building ship sides above deck, staterooms, etc., for, being light, it is not a burden to the ship. It is indigenous to the mountains, but is sometimes found in the prairies and lowland forests.

DELGADO."

"Gives logs up to twenty-five feet long to eighteen inches square. It is useful for sculpture, musical instruments, decoration, turning and cabinet purposes.

FOREMAN."

"Second Order.

Color.—Bone white or ashy with white stains.

Texture.—Soft and compact; pores scarcely perceptible; breaks in long splinters, the shavings fine, united and curled. It is plentiful in La Laguna, Bataan, Cavite, Pangasinan and Tayabas. It is used for cabinet purposes.

The chairs in Manila known as Paete, and in Spain as Victoria chairs, are made from this wood.

During my stay in the Archipelago match boxes were manufactured from specimens of this wood from Tayabas, by the manager of the Industrial Match Factory; were very satisfactory, with an opposite result from those from Laguna, the pieces broke while being bent to form the boxes, the fibers of these pieces not being straight.

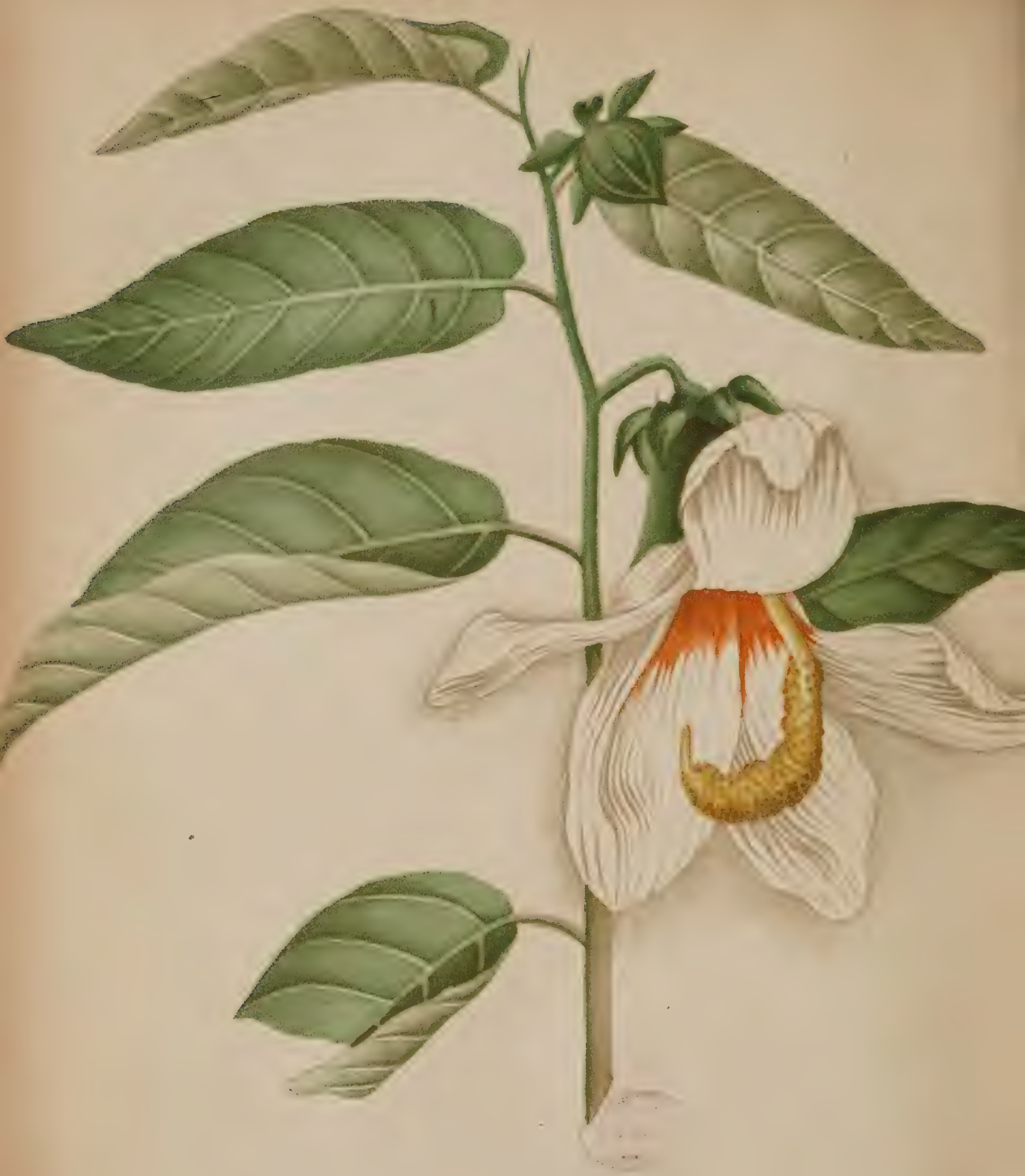
The mean results of tests are as follows: Elasticity 0.0068 m. (the extremes vary so much that a specimen from Bataan gave an elongation of 0.010 m., while one from Tayabas only 0.0034 m.); broke with a weight of 26.829 kilograms; weight in the air 6.585 grams, and specific gravity 0.495. S. Vidal."

"Leaves opposite, with short petioles, obtuse at the base or nearly ovately obtuse and acuminate woolly-pubescent, three to four inches. Milky sap. Branches with small whitish protrubing points. Flowers in terminal cymes; cymes woolly, calyx five-parted, divisions of calyx ovate obtuse, pubescent in the outside, four or five times shorter than the smooth tube of the corolla, five scales on the calyx, half elliptical, twice shorter than the divisions of the calyx, nearly alternating with the limbs of the calyx; the divisions of the calyx unequal, the larger ones opposite the divisions of the corolla, with tricrenate apex, the others alternate, a little shorter and three times narrower, linear-acute, anthers hairy on the back. Corolla with comparatively short tube and five divisions, throat of corolla with a crown composed of appendages. Stamens inserted in the tube, protruding, filaments short, anthers arrow-shaped, partly adhering to the stigma. Ovaries two, pressed close together, smooth. Style thread-like, with the apex dilated.

(Padre Blanco's description of 'Anaser Laniti' does not apply to this species.)

Lieut. Safford, U. S. N."

"A medium sized tree, well known and used in the manufacture of chairs, benches and other articles, because it is white and easily worked. Much milk exudes from it. The fruit which in reality consists of two fallicles, united together, a 'jeme,' in length, and sometimes many flies are found inside, for which reason the Indians think this tree bears flies for fruit. The fact is the female burrows into the fruit, deposits her eggs that afterwards hatch and make their exit either by burrowing out or by the fruit drying up and breaking. The hole which the fly makes is very small and closes immediately with the milk which exudes and is



LANUTAN 1st.

Thespesia campylosiphon, Rolfe.
Hibiscus grewiæfolius, Hassk.– Miq.
Hibiscus Vidalianus, Nav.

Atlas, Flora de Filipinas, Blanco, lám. 45.

difficult to see. I have seen these flies very often; they are the size of ordinary flies, but grow larger. Flowers in August.

There is another species with the axillary flowers solitary. Spreng. Sist. Veg., t. I., p. 588, places these trees in the genus *Geniostoma*, but his description does not agree with the above, which is correct. BLANCO."

"Grows from nine to eighteen feet long, and twelve to fifteen inches square. Special lengths to twenty-five feet and eighteen inches square. Useful for sculpture, musical instruments, decoration, turning and cabinet making. BROWN."

"Is a tree of the second order in the Philippines.

COLOR.—Bone white, or ashy with white spots.

TEXTURE.—Soft and compact with pores scarcely perceptible; breaks in long splinters; the shavings are fine, united and curled. It is used in cabinet making.

SALVADOR CERON, p. 294."

LANUTAN 1st.

Thespesia campylosiphon, Rolfe.
(Hibiscus Grewiæfolius, Hask.) Miq.
(Hibiscus Vidalianus, Naves.)
Malvaceæ.

WHERE FOUND—Islands of Luzon, Mindoro, Negros.

DESCRIPTION—*Second Group.*

"COLOR.—Reddish white or clear red with yellowish spots.

TEXTURE.—Fine, fibers straight and pores small; it is easily worked.

It is principally found in the Visayas and also in Luzon, Mindoro and other islands of the Archipelago. It is used in cabinet making and ordinary construction as sawed lumber. One sole test made from a specimen from the Island of Negros gave the following result: Elasticity 0.002 m.; broke with a weight of 32.667 kilograms; weight in the air 10.499 grams, and specific gravity 0.784.

S. VIDAL.

"A TREE OF THE FAMILY MALVACEÆ.

Branches, leaves and peduncles together with the involucre and calyx covered with very fine stellate down; leaves with short petioles ovate-oblong acuminate, nearly entire, under the lense subglandulose crenulate, three-veined at the base, and five to six ribbed, leathery, five to six inches long, stipules ovate-lanceolate inequilateral, deciduous, peduncles axillary, solitary longer than the petiole, jointed at the apex, involucre of six to ten leaves shorter than the calyx, which, when young,

is somewhat five-winged and is coriaceous; corolla sulphur-yellow, dark red within, stellate-downy without, capsule connate woody with the calyx at its base, five-celled, the cells divided into two parts and having two seeds, the seeds with a yellow line.

(Description from *Flora Indiæ Bataviæ*, Miquel.)

There are several distinct species of *Anonaceæ*, the wood of which is called Lanutan. The following description is taken from Sebastian Vidal's 'Memoria sobre el Ramo de Montes.' He refers it to Padre Blanco's Unona latifolia.

In the 'Revision de Plantas Vasculares Filipinas,' of Sebastian Vidal, the name Lanutan is applied to a species of Xylopia and to Saccopetalum longipes."

SACCOPETALUM LONGIPES.

"A tree belonging to the *Anonaceæ*. Young branches with reddish-downy leaves, nearly sessile, somewhat rounded at the base and slightly oblique, oblong or oblong-elliptical, moderately acuminate, four to ten centimeters long, two to four centimeters broad, smooth, sparsely downy on the veins, stiff. Flowers solitary or nearly so, with very long thread-like peduncles, ten centimeters and more. Outer petals small, inner ones much longer, one centimeter, in the form of a pouch at the base. Stamens arranged in four to six series. Receptacle nearly globose, downy. Carpels oval with thick pedicels, ten to fifteen millimeters long; blackish with rough points.

Bagae, Province of Bataan. Guinayangan, Province of Tayabas. Common name, Lanutan. VIDAL."

"IS A TREE OF THE SECOND ORDER.

This tree grows in some of the islands in the Philippine group.

COLOR.—Whitish red or clear red with yellow borders.

TEXTURE.—Fine, with fiber straight and pores small; it is easily worked. It is used in cabinet making and in ordinary construction in a sawed form.

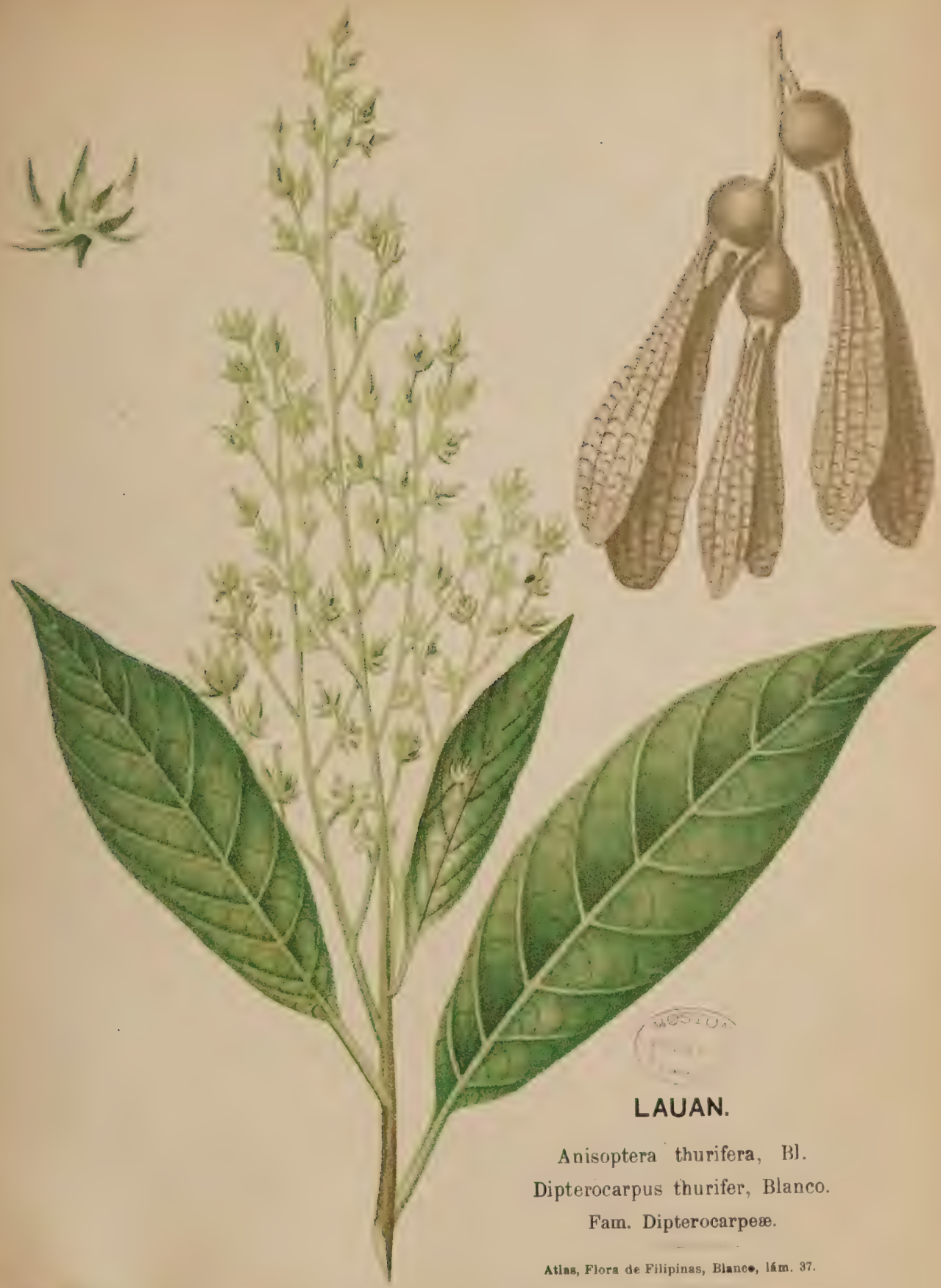
SALVADOR CERON, p. 294.

LAUAN.

Anisoptera thurifera, Bl.
Dipterocarpus thurifer, Blanco.
Dipterocarpeae.

SYNONYMS—Lauan, Sandana, Lauaan, *Tagalog;* Lanaan, *Visaya.*

WHERE FOUND—Batangas, Bataan, Bulacan, Cagayan, Zambales, Albay, Cavite, Sorsogon, Tayabas, Pampanga, Island of Luzon; Mindoro, Mindoro; Leyte, Leyte; Iloilo, Capiz, Panay; Romblon, Romblon; Samar, Samar; Negros, Negros.



LAUAN.

Anisoptera thurifera, Bl.

Dipterocarpus thurifer, Blanco.

Fam. Dipterocarpeæ.

Atlas, Flora de Filipinas, Blanco, lám. 37.

DESCRIPTION—*Third Group.*

"Color—Reddish white, or ashy with gray spots.

Texture—Loose and filaceous. Pores distinctly marked; brittle.

Tree of First Magnitude—Gives a white, hard resinous gum, very odorous, used instead of incense in some churches; it is abundant in many parts of the Islands, especially in the center and south of Luzon. It is used principally in the construction of bancas. Very little used in ordinary construction.

In the second part of the manuscript of the history of the Philippines, of Padre Gaspar de S. Agustin, it is related that the sides of the old galleons were made of this wood, as the balls could not tear splinters from it; it is not now used in the construction of large vessels. S. Vidal."

"If the Lauan and its allies were as abundant in Spain as they are in these Islands, many ships could be built each year, capable of resisting the enemy. It is related that the Dutch said of one of our galleons of the line, against which they had fought, that its sides were of iron, and its projectiles of wood, which was literally true, for balls being scarce, some were made of Molave and fired against them, and as it is a wood which upon being broken up gives many splinters, each splinter served as a projectile, wounding whomsoever it hit. The sides were of planks of Lauan, but the knees and ribs were of Molave; thus in a battle, the balls of the enemy remained indented in the sides of the ship, the same as if they had struck a bag of wool.

The wood of the Lauan is so strong and fibrous that balls fired against it can neither break nor split it, but it yields to the concussion and detains the ball in its meshes without piercing it.

Cascos, bancas, sacayanes and other kinds of vessels used in these islands are made from it, as well as planks and masts for ships.

These trees are so tall that it is difficult to discern the branches at the apex, as the trunk is free of them its entire length until near the top.

Flowers in the months of March, April and May, and if the sprouts and the tender branches are not destroyed by hurricanes and storms, the flowers furnish abundant material for bees. Its fruit serves as food for birds and animals.

There are two species, one called Lauan Mulato, which is of a dark red color, and the other, white Lauan, somewhat inferior, but nevertheless useful; it gives good planks for vessels, flooring and ceilings for houses. It is used in Manila for covering the floors laid with Molave, and also in Visayas for the same purpose, as it is more healthful and less injurious to the feet than the Molave, which is cold. Delgado."

"Is obtained in sizes the same as Guijo. It is a light, useful wood and easily worked. It is said that the old Philippine-Mexican galleons were of this wood, as it did not split with shot. Foreman."

"Leaves alternate, ovate, elongated, with a longitudinal ridge, entire and smooth. Terminal flowers in very large panicles. Calyx inferior (before maturity), deeply five-cleft, divisions linear, erect, and equal. Corolla longer than the calyx, deciduous, of five petals almost linear, alternating with the parts of the calyx and attached to it on the inside. Stamens, more than fifty, unequally inserted on the base of the ovary. Filaments very short. Anthers, small, oval, terminating in a long hair. Ovary, oval and adherent at maturity. Styles, three, which grow somewhat longer at maturity. Stigmas simple. Nut globular, crowned at the apex with the parts of the calyx which are very large at maturity and lanceolate, like wings, two of them longer than the rest, with the covering of the capsule thin and woody, containing one seed, the lobes or parts of which are imbricated.

Trees are very large and thick. I finally saw its flowers in season, after many years, and they are as above described. The natives call it Lauaan and Sandana.

When incisions are made in the bark it gives a resin very fragrant, white and hard, which is used instead of incense in some churches.

Padre Gaspar de S. Agustin says, in the second part of the manuscript of his history of the Philippines, that the planks composing the sides of the old galleons were of Lauan, for projectiles striking them do not cause this wood to splinter. The fruit is similar to a filbert; and the larger wings which crown it are three inches long. It is common in Visayas, in the Tagal country, and in many other parts; ordinary dry goods boxes used in Manila are made of it.

So great is the disorder and confusion which the natives have introduced in the nomenclature of these trees, that to classify it correctly and arrive at a true knowledge of its properties have cost me years of study and investigation. I saw it in the forests of San Mateo in June with perfect flowers and ripe fruit. The parts of the calyx fully developed, I have called wings, for as such they appear to be, and by means of them the fruit falls to the earth very straight and with a gyratory movement. BLANCO, p. 310., 2d ed."

MACAASIN.

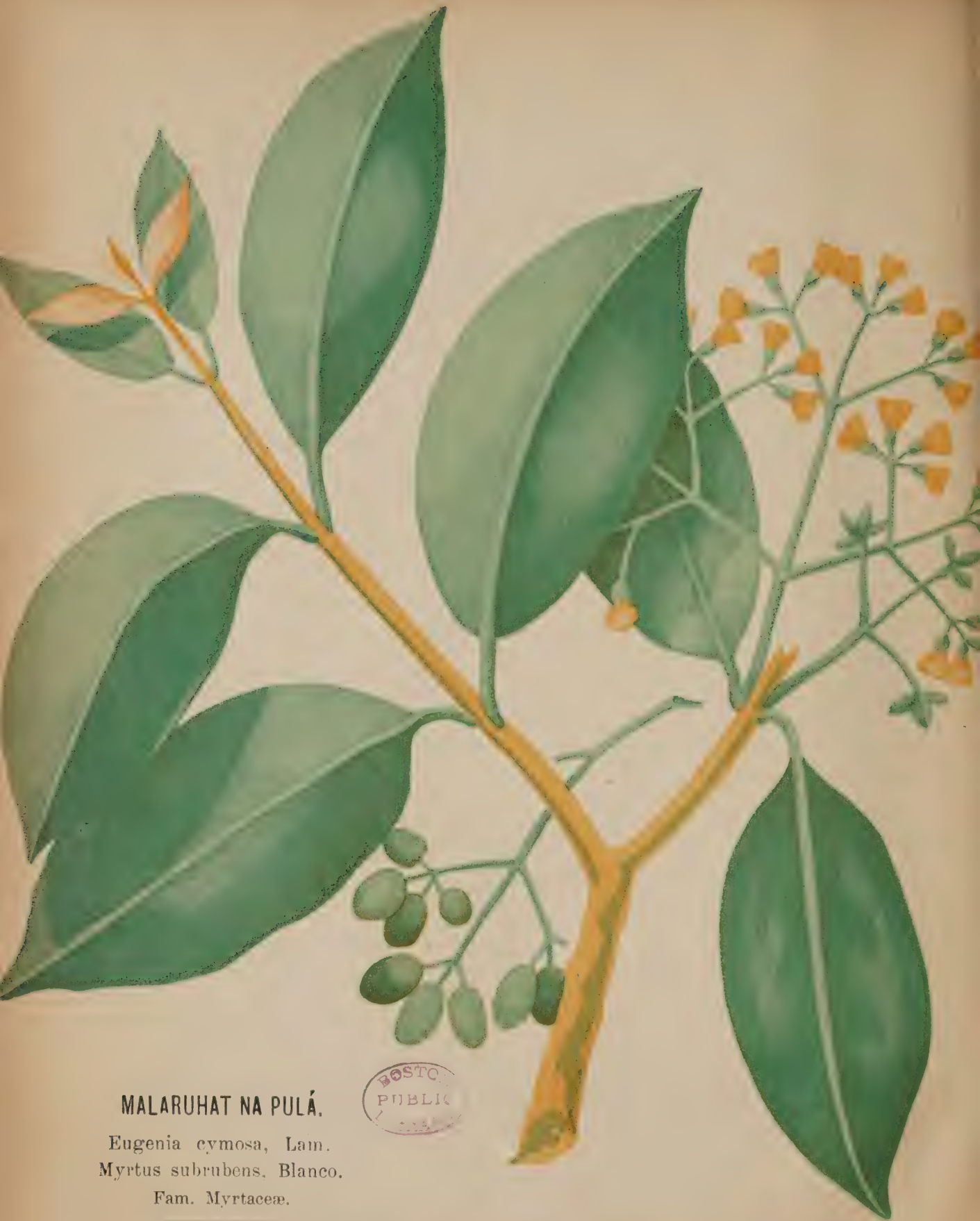
Eugenia Sp.
Myrtaceæ.

SYNONYMS—Macasin, Macasim, Macaasim, Macaasin.

WHERE FOUND—Islands of Luzon, Masbate.

DESCRIPTION—*Second Group.*

"There are two principal varieties, red and white. I do not know to what species they belong. The color of the first is very similar to that of Batitinan, that is reddish ash, and is distinguished from it by its texture, being much more compact, and its pores less marked; breaks as if brittle. It is less adapted to ordinary and naval construction than Batitinan.



MALARUHAT NA PULÁ.

Eugenia cymosa, Lam.
Myrtus subrubens, Blanco.
Fam. Myrtaceæ.

Made from drawing copied from nature by R. García.

The second variety has a clearer red color with yellow borders. It is taken principally from the forests of Tayabas.

A single experiment made with specimens of the red variety, which is the better, gave following results: Elasticity 0.0052 m.; broke with a weight of 28.526 kilograms; weight in the air 8.780 grams., and specific gravity 0.683.

SEBASTIAN VIDAL, p. 162."

"Can be used for interior house work and floors. It is somewhat inferior to Banaba, but supplies its place when Banaba is scarce. It can be got in greater lengths and square than Banaba. FOREMAN."

"The tender branches are of a cylindrical form, somewhat compressed in the upper part. Front of petiole sharp and grooved. (The sides atropy, when dry.)

Leaves at base slightly acuminate, elliptical-acuminate, long, lineal obtuse, parchment-like, with glands in the upper part; thicker on under side, hairy, punctate in the upper part, lustrous (is black when dry); margins grooved on under side, pale, with the vein frequently lineal, extended, tender and interwoven, united near the margin where they are slender. They are generally three to four and one-half inches long by one and one-half to two inches wide. 'Perula' opposite, in the young branches, having the appearance of stipules, peltate and divergent in the upper part. Stems lateral and terminal and close together; those without leaves three or four inches long, very extended, racemose or umbellate, bearing flowers; flowers sessile, ovate, joined together, very often with short peduncle, with two bracts at base.

Calyx one and one-half to one and three-quarters inches long, meaty and glandular in the lower part; the vertex rounded, membranous, pale (margin of calyx not free) divided with irregular clefts, cut off, deciduous, membranous, petaloideous, opaque sepals very thick, hair and punctate. MIQUEL."

MALARUHAT NA PULÁ.

Eugenia cymosa, Lam.
(Myrtus subrubens, Blanco.)
Fam. Myrtaceæ.

SYNONYMS—Malaruhat, Malarujat, Maladujat, *Tagalog*.

WHERE FOUND—Islands of Luzon and Mindoro.

DESCRIPTION—*Second Group.*

"TREE OF LARGE DIMENSIONS.

COLOR.—Yellowish gray, with grain of an intense gray or ashy color and violet-colored spots; some specimens are of an earthy red color with white spots.

TEXTURE.—Very compact and brittle, pores fine and sometimes very distinctly marked; breaks off short. It is used for flooring, partitions, rafters, sills, etc., in ordinary construction, and in cabinet, for furniture.

It is plentiful in many provinces.

Señor Cortes made following tests:

ORIGIN	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS	ORIGIN	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS
Nueva Ecija	2.8	0.680	195.5	0.766	Cavite	2	1.104	203	0.750
Laguna	3	0.390	117.5	0.448	Bulacan	3.4	0.845	211.5	0.810
Bataan	1.4	1.136	158.	0.612					

It is only in the last few years that this wood has been known in Manila, being brought from Laguna. From experience in building houses with it in that province and in Banang, Province of Batangas, it is shown that it can substitute the Banaba, being analogous to it.

Logs of large dimensions are received here. D. VIDAL."

"IS A TREE OF LARGE DIMENSIONS.

COLOR.—Yellowish gray, with grain of an intense gray or ashy color with purple spots. Some specimens are of an earthy red color with white spots.

TEXTURE.—Very compact, brittle; pores fine and sometimes heavily marked. Gives ordinary sized planks and used occasionally for making common furniture. It is found in many provinces of Luzon, as, for example, La Laguna, Nueva Ecija, Bataan, Cavite, Tayabas, etc.

Elasticity is 0.0046 m.; broke with a weight of 27.375 kg.; weight in the air 8.240 gr., and specific gravity 0.641. S. VIDAL."

"Branches opposite. Leaves opposite, lanceolate, entire and smooth. Flowers terminal in umbels, with secondary peduncles opposite. Calyx bell-shaped with four obtuse teeth. Corolla of four petals, petals rounded and concave, inserted between the divisions of the calyx. Stamens numerous fixed in the limb of the calyx and twice as long as it. Style equal in length to calyx. Stigma simple, awl-shaped. Fruit crowned with the calyx.

IS A TREE OF LARGE DIMENSIONS.—The wood is used in carpentry; the flowers and bark are red.

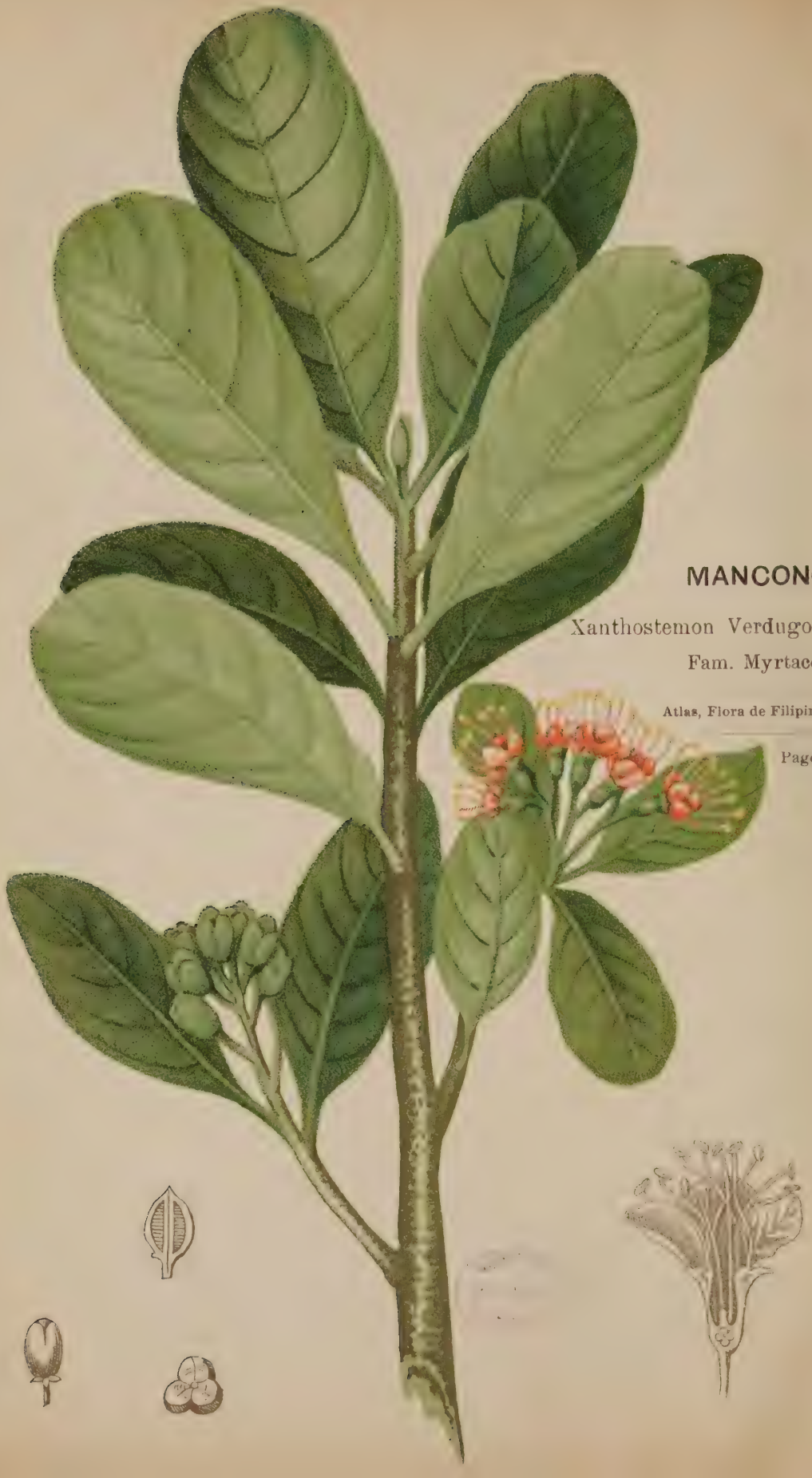
It flowers in February. BLANCO."

"IS A TREE OF LARGE DIMENSIONS.—Grows in the Philippines, especially in Luzon.

COLOR.—Yellowish gray, occasionally with grain of an intense gray or ashy color and with purple borders; sometimes it is of an earthy red color with white spots.

TEXTURE.—Very compact and brittle, the pores fine and well defined.

It is used for planks and for ordinary furniture. SALVADOR CERON, p. 294."



MANCONÓ.

Xanthostemon Verdugonianus, Naves.

Fam. Myrtaceæ.

Atlas, Flora de Filipinas, Blanco, lám. 189.

Page 65.

MALATAPAY.

Alangium octopetalum, Blanco.?
Cornaceæ.

SYNONYMS—Malatapay, Malacapay, *Tagalog.*

WHERE FOUND—Island of Luzon.

DESCRIPTION—*First Group.*

"COLOR.—Yellowish, with grayish black stains; in time changes to a more intense color, finally becomes black.

TEXTURE.—Very compact; breaks in short splinters, sometimes brittle. It is much prized in the manufacture of fine furniture. The tree does not generally pass the third order.

It is scarce, generally only a few being found in a place. No experiments have yet been made as to its elasticity, weight, etc. S. VIDAL."

"Leaves in clusters, oval, smooth, somewhat serrated at the extremity. Petioles short. Flowers in compound racemes. Calyx adherent, with a few indistinct teeth. Corolla of eight leathery petals, stamens nine to eleven inserted in the tube of the calyx. Ovary at the bottom of the flower, downy, and rough. Style and stigma absent. BLANCO."

"IS A TREE OF THE THIRD ORDER.—Grows in the mountainous parts of the Philippines.

COLOR.—Yellowish with grayish black streaks. It gradually changes color until in time it becomes black.

TEXTURE.—Very compact; breaks in short brittle splinters. It is much prized for cabinet making. SALVADOR CERON, p. 294."

MANCONÓ.

Xanthostemon Verdugonianus, Naves.
Fam. Myrtaceæ.

SYNONYMS—Manconó, *Tagalog;* Manconó, *Visaya;* Marconi, *Mamanua;* Iron Wood, Iron Tree, *Java.*

WHERE FOUND—Islands of Luzon and Mindanao.

DESCRIPTION—*Superior Group.*

"COLOR.—Dark reddish.

TEXTURE AND FIBER.—Fine, very hard and compact, heavier than Dungon, and is difficult to work. It is found in the forests of Mindanao, whence come

the great pieces which serve as pillars in the church of San Ignacio of the P. P. Jesuits, in this capital. It is also found in Southern Luzon in the forests of Guinayangan, Tayabas, and Ragay, Camarines Sur, of small size and somewhat scarce, due possibly to the density of the forests in which they are found, and also to the fact that Luzon is not its proper zone of vegetation.

The natives of above named towns have never given this species a name. The specimens seen were from seventeen to twenty centimeters in diameter.

No Manconó timber has come here from other places, for which reason there has never been a supply in the market. R. GARCIA."

"It is a very hard wood, found in Mindanao island. It is classed as a species of Lignum Vitæ. CONGRESSIONAL PAMPHLET."

"A very large tree. Branches extending upward, thickly covered with yellowish down and marked with scars from the petioles of fallen leaves. Leaves distributed either alternate, nearly opposite or in whorls, obovate with their base decurrent upon the petiole, cuneate or nearly so, with the apex rounded, obtuse or slightly emarginate, feather-veined, entire or somewhat repand, covered with scarf or minute scales on both sides, thinly marked with black dots underneath, three to seven centimeters long, one to three and one-half centimeters broad, cariaceous, of a beautiful green. Petioles four to seven millimeters long, convex in the back, flat in front, slightly enlarged at the base. Cymes terminal corymb-like, with a moderate number of flowers. Pedicels three millimeters long, having linear bracts. Calyx bell-shaped, five to six millimeters long, three to five millimeters wide, four to five toothed, with the teeth very small and triangular in form. Petals four to five, oval, four millimeters long, three millimeters wide, of a deep purple (crimson?). Stamens less than twenty, very long, purplish when young, deep purple when older, in one row, with the bases compressed. Anthers two-celled, splitting longitudinally, freely moving on the top of the stipule, yellow. Ovary included in the tube of the calyx, two to three-celled, many ovules, smooth. Style almost of the same length as the stamens, a little thicker. Stigma small. Capsule connected with the calyx, two to three celled, with two to three compartments, many seeded, the cells opening along their dorsal suture. The stems, pedicels, bracts and calyx covered sparsely with whitish down. NAVES."

"The Manconó is allied to the Iron Tree of Java, Metrosideros vera, both belonging to the Myrtaceæ, and having very hard and heavy wood. The latter tree, described by Padre Blanco under the name of Metrosideros pictipetala is said to be found in Cebu, where it is called Barit. It is not used commonly, so that it is not mentioned in the list of economic woods. LIEUT. SAFFORD, U. S. N."

MANGACHAPUY.

Vatica Mangachopoi, Blanco.
Vatica apteranthera, Blanco.
Dipterocarpeæ.

SYNONYMS--Mangachapuy, Mangachapui, Mangachapoi, Guisong dilao, *Tagalog*.

WHERE FOUND--Island of Luzon, Mindanao, Mindoro, Romblon.

DESCRIPTION--*Second Group.*

"TREE OF FIRST ORDER.--Very similar to the Guijo, with which it is sometimes confounded. The Indians of Angat give the name of Mangachapoi to another species (vatica apteranthera). It gives splendid planks. It has two varieties of color, due probably to the age and growth of the tree. That called White Mangachapuy is of an ashy yellow color, and the red variety, which is more common, is distinguishable from the other by its color.

This wood at first is generally of a clear straw color, which in time changes almost to black. It is soft, easily worked, has long fibers and long pores, regular texture, brittle, breaks in long splinters. Some specimens emit an odor similar to linseed, but generally it is inodorous; shavings somewhat rough and very little curled. It is used for flooring in ordinary construction and in naval as planks for decks and round houses, and also for masts.

Formerly it was brought to Manila more frequently than at present. Some timber dealers try to pass it off as Yacal. It is plentiful in the Islands.

Señor Cortes made the following tests:

LOCALITY	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS	LOCALITY	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS
Mindoro.....	1.8	1.088	176.	0.701	Bataan.....	1.2	1.216	211.5	0.831

In China the Mangasinoro is passed off as Mangachapui, which in turn is called white Molave. D. VIDAL."

"TREE OF FIRST MAGNITUDE.

COLOR.--Of two shades, white and red. The first is more of an ashy yellow shade.

TEXTURE.--Compact, brittle, breaks in long splinters; fibers compressed; pores longitudinal. Some specimens emit an odor similar to linseed, shavings somewhat rough and very little curled, it is more common than the second, which is only distinguishable from it by its reddish tint.

Elasticity 0.003 m.; broke with a weight of 33.127 kilograms; weight in the air 9.665 grams, and specific gravity 0.766. S. VIDAL."

"The tree called Mangachapuy, a species of Lauan, is very highly prized in these Islands, the selected trees being used for masts of galleons, tenders and

junks. It is very light and as beautiful as the Lanuaan and durable in the sea. It is used in the construction of barratos and cascos, for 'sacayanes' (armed vessels of the Moros), and gives good planks for finishing them and for other uses. It should be kept free of dampness, which in a short time damages it. It should also be guarded against the attacks of the anay, its worst enemy. This enemy can destroy in a single night the entire stock of goods in a warehouse and an entire library, eating entirely through bales and books from one side to the other. Some place honey near the place of exit of the anay to attract it. This insect neither bites nor stings, but with the viscous fluid which it secretes, it softens the hardest wood and with its mouth, which is exceedingly hard, it cuts away until it leaves it as hollow as a cane. In Manila they put vessels of oil or petroleum under the legs of the bookcases, etc., to prevent these insects from entering.

This insect lives and breeds in the ground, where it constructs a residence of many rooms and passages; in the center of this house there is a retreat, where resides an anay, much larger than the rest, the king or sovereign of that well-regulated republic, etc. DELGADO."

"Gives logs up to fifty-five feet long to twenty inches square. It is very elastic and withstands the climate, when seasoned, as well as Teak. It is used in Manila for masts and decks of vessels and for all work exposed to sun and rain. It is very much esteemed by those who know its good qualities.

FOREMAN."

"Leaves alternate, varying between ovate and lanceolate, entire, smooth and somewhat stiff. Petioles very short. Flowers in panicles. Calyx, corolla and stamens the same as in the species sinensis. Anthers have appearance of being divided in two parts, crosswise and without wings. Drupe globular, thin, with three compartments which contain one seed each. Other component parts same as in the other species.

This tree is of larger dimensions than the Vatica Sinensis, and is erroneously called Mangachapoi by the Indians of Angat. It gives fine planks. Its fruit is eaten, after being roasted in hot ashes. The parts of the calyx are unequal, two being longer.

The anthers are peculiar, as I have remarked.

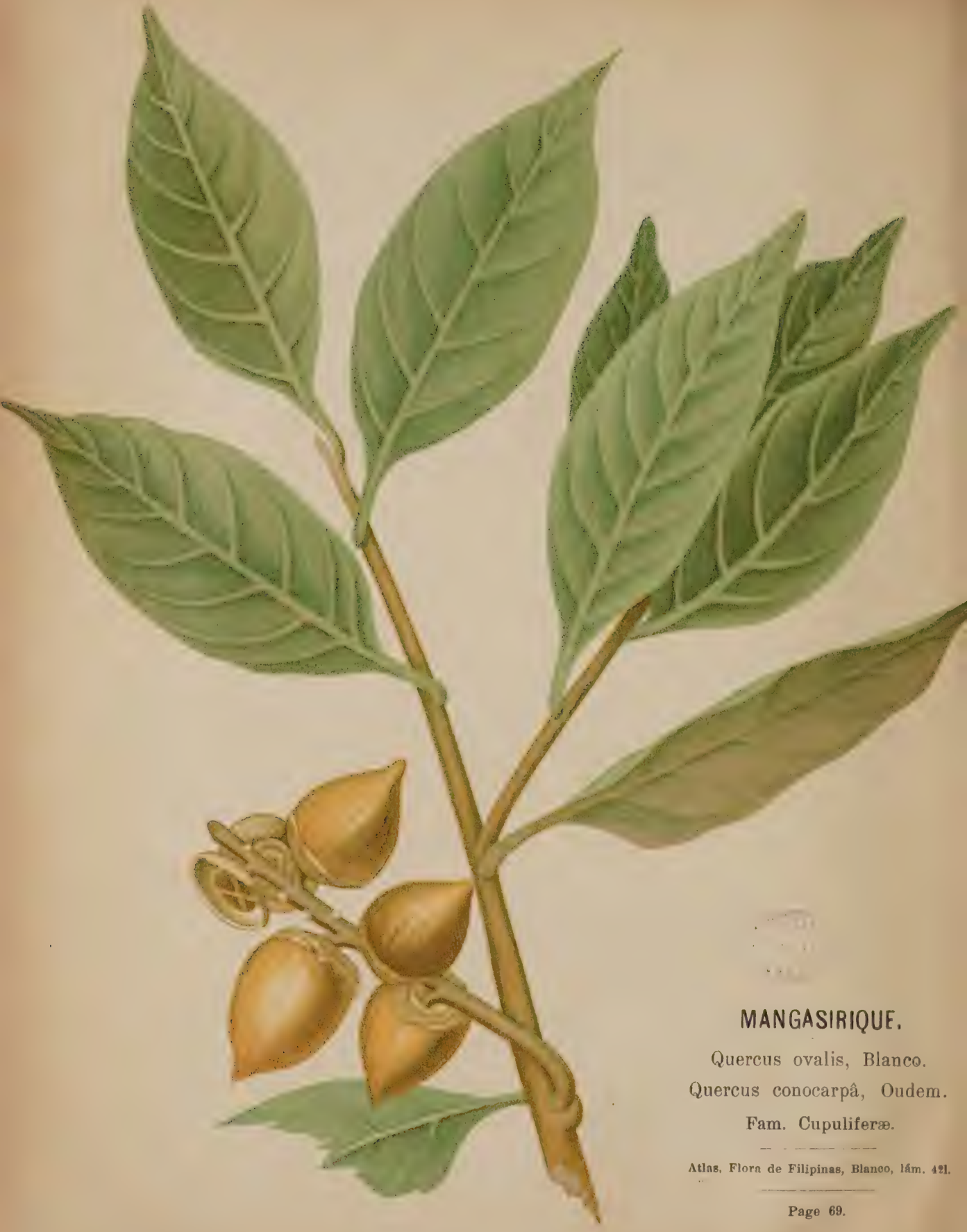
From the drupe, which is not meaty, a very clear inodorous resin exudes before maturity. Flowers in May. Is called Mangachapoi in Angat, but this is of the species dipterocarpus—new species. BLANCO, p. 281, 2d ed."

"TREE OF THE FIRST MAGNITUDE.—Grows in the Philippine Archipelago.

COLOR.—Two varieties, white and red; the white variety is the better. It has a yellowish ashy tint.

TEXTURE.—Compact and brittle; fibers compressed; pores longitudinal; breaks in long splinters. It is used in ordinary and naval construction.

SALVADOR CERON, p. 295."



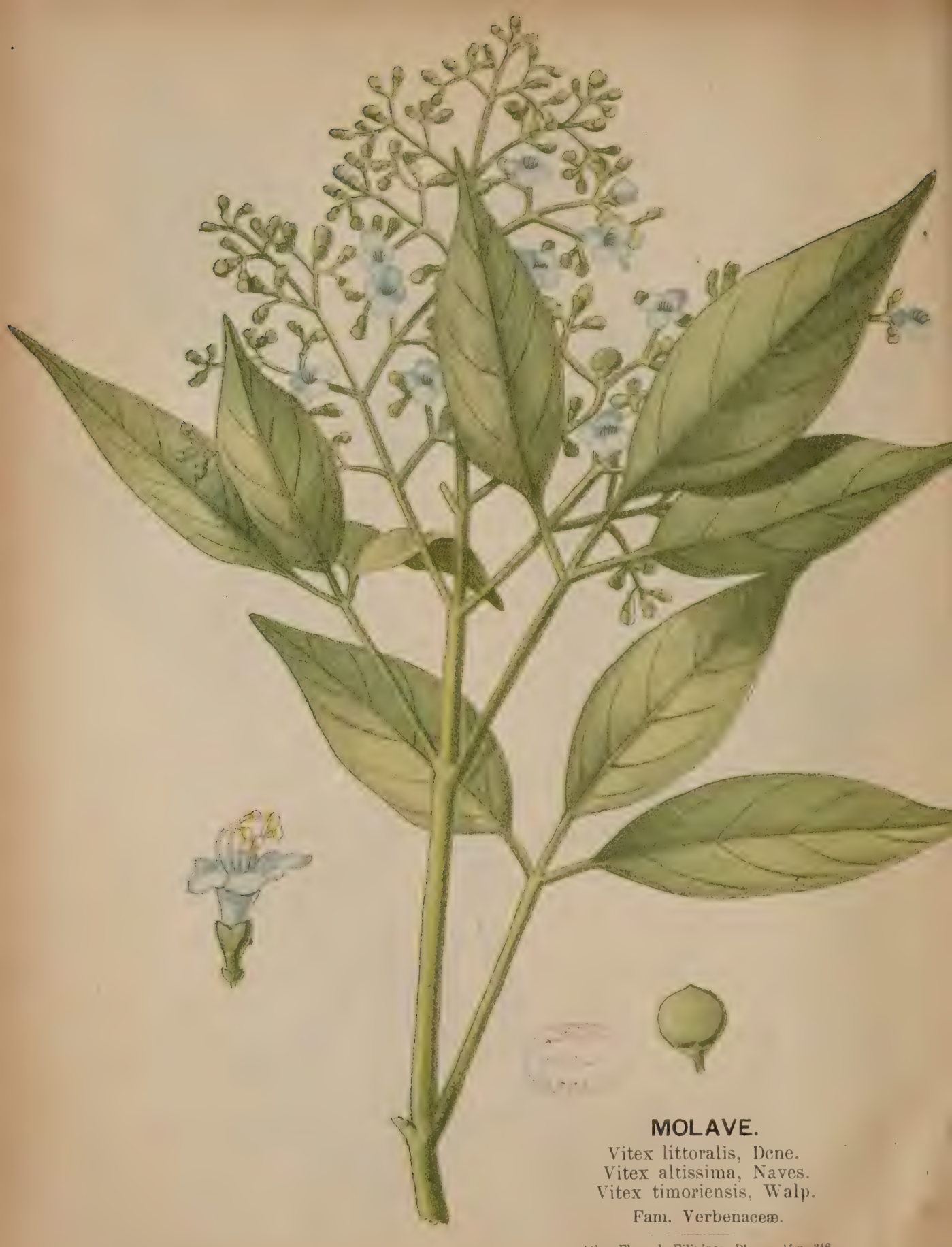
MANGASIRIQUE.

Quercus ovalis, Blanco.

Quercus conocarpâ, Oudem.

Fam. Cupuliferæ.

Atlas, Flora de Filipinas, Blanco, lám. 421.



MOLAVE.

Vitex littoralis, Dene.
Vitex altissima, Naves.
Vitex timoriensis, Walp.

Fam. Verbenaceæ.

Atlas, Flora de Filipinas, Blanco, lám. 346.

MANGASIRIQUE.

Quercus ovalis, Blanco.
Quercus conocarpâ, Naves.
Fam. Cupuliferæ.

SYNONYMS—Mangasirique, Macabingao, Hayopag, Olayan, *Tagalog*.

WHERE FOUND—Provinces of Bulacan and Morong, Island of Luzon.

DESCRIPTION—*Second Group.*

"Leaves scattered, ovate, obtuse-acuminate, emarginate, entire and smooth. Petioles very short. Flowers monœcious. Males, ...Females, growing in a spike, and crowded together. Calyx firm, woody, flat at the base and covered in its upper part with a species of bark, entire and with circular lines on the abdomen. Corolla, none. Gland oval, united below with the calyx, the cover a medium between leathery and woody, crowned with three short styles, fixed upon a very small globular excrescence and with a seed sunken at the base with two lobes.

Trees large and grow in Angat. The leaves are not aromatic and are almost a palm in length. They are viscous, when damp. The acorns are not conical as in the other species, but oval, from which it takes its specific name, nor is the bark so hard. The seeds have an agreeable taste. Flowers in April. In Angat it is called Macabingao, Magasirique and in other parts Hayopag, which is its proper name.

Is it a variety of Quercus concentrica? BLANCO, p. 502, 2d ed."

MOLAVE.

Vitex littoralis, Dcne.
Vitex altissima, Naves.
Vitex timoriensis, Walp.
Verbenaceæ.

SYNONYMS—Molave, Molauin, Lanahan, *Tagalog;* Agubarao, Bulaon, Tugan, *Visaya;* Sagad, Anugauan, *Ilocano;* Bongogon, *Visaya, for female variety;* Pururi, or New Zealand Teak, *New Zealand.*

WHERE FOUND—Islands of Cebu, Leyte, Luzon, Masbate, Mindanao, Mindoro, Negros, Panay, Paragua, Samar, Sorsogon.

DESCRIPTION—*Superior Group.*

"COLOR.—White, although it appears somewhat dark when worked, on account of containing a species of oily liquid, for which reason it is called Lanahan (oily), but after a short time it regains its natural whiteness. It is the wood best known

and most common in these Islands. I have thought proper to give it the first place for its great worth and adaptability to the uses in the various manufactures of the Archipelago. It is the 'Queen of Woods,' not only on account of what has been said above, but, also, for its durability and resistance to decay, whether it be placed under cover or exposed to the action of the weather, or in water.

It is easily sawed and worked, especially when recently cut. It can be cut into magnificent planks, and used in various ways, particularly for flooring. The use of bricks for flooring in the Philippines is very prejudicial to health on account of dampness. These planks are used, also, in the construction of walls and partitions, for which purpose it is solid and lasting. There is scarcely a house in the Islands in the building of which Molave is not used for posts, called 'harigues'. These are buried three feet in the ground, in which case, although it may be damp or muddy, they will not easily rot. Upon them are built houses, convents and churches, with more security than over walls of mortar and stone; for these, on account of frequent earthquakes, break and fall, while the 'harigues' remain standing and unaffected, when the planks and woodwork which they sustain are well joined and fastened. Thus, the houses are like tables whose feet are fastened in the ground, and are not affected by earthquakes, with nothing to guard against but fire. Cross pieces for framing the roofs of buildings, called here 'batangas', are made from this wood, and are of great value on account of its strength and exemption from decay; but it is principally used in the construction of the galleons and ships, which support and defend these Islands, which go and come from New Spain, carrying the annual supplies; for everything other than the masts and decks is constructed of Molave, it being used with advantage over the oak of Spain; the ribs of said galleons are of Molave of eight or ten points, as close together as the fingers on the hand, and thus, the ships of the Philippines are in a manner castles, and their sides, strong walls upon which a cannon ball can make no impression; the forepart of the keel, crotches and knees, all are made of Molave, excepting the keel itself, which is generally made of Guijo or Guiso, as it is a timber long and straight, which is not the case with Molave. Beautiful statues are also made from Molave which are very durable, being proof against the attacks of the woodlouse.

There are two species, male and female; the former is the better wood; the latter the Tagals call Molauin aso (Prema nauseosa, Blanco), and the Visayas, 'Bongagon;' is good for boards and musical instruments, being very sonorous. This species of Molave is white, but not as solid as the male and not so durable. I remember having seen in Cadiz, among many curious freaks, some pieces of Molave, turned to stone. I afterwards saw the same in Manila and in the provinces; it is very curious, that when placed for a time in water, it turns to stone and becomes so hard that tools can be ground with it; and in making comparisons of the hardness of an object, in these Islands, it has given birth to a saying, viz: 'It is hard as a stone of Molave cut in the last quarter of the moon;' it is the best of the stones.

Excellent sugar mills for grinding cane are made of this wood; it also makes good firewood, giving a very clear flame, and very white ashes, which would be

useful in Spain for making lye for cleaning clothes, in place of the ashes of the almond tree which they now use.

The Molave boiled in water, in small pieces, is an admirable remedy against poison, as it acts as a strong emetic, and leaves the body in a convalescent condition. I have seen the sawdust from it applied to wounds to stop the flow of blood, and heals the same as if it were the best balsam. DELGADO, A. D. 1733."

"Grows to twenty meters in height, although its diameter does not exceed 0.60 m., according to Sr. Valdez, Colonel of Engineers.

COLOR.—Yellow to yellowish green, and ashy; in water it takes a yellow color.

ODOR.—Slightly acid, sometimes imperceptible.

TASTE.—Slightly bitter.

TEXTURE.—Compact and fine, fibers compressed and pores small, almost imperceptible in some specimens, nevertheless they can be seen.

Breaks in short splinters, shavings are very fine, compact, flexible and curled. It is preferred above all others in construction; it resists the weather and lasts well under water, and when employed in the construction of partitions give the whitewash a yellow tint; its excellent qualities have gained for it the name of 'Queen of the Philippine Woods.' Formerly it was thought that it could not be substituted. It is plentiful in all the Islands of the Archipelago, except in some provinces of the north and center of Luzon. Trees of large dimensions are becoming scarce in those places where they can be easily removed.

Numerous tests made with specimens from different provinces have given widely different results. Taking the mean of all these we obtain the following results: Elasticity 0.0035 m.; the point of greatest resistance is to a weight of 41.552 kilograms; weight in open air 10.499 grams, and specific gravity 0.819.

S. VIDAL."

"COLOR.—Yellow, yellowish green and ashy; placed in water it takes a yellow color.

ODOR.—Slightly acid, sometimes not perceptible.

TASTE.—Slightly bitter.

TEXTURE.—Fibers fine and compact, compressed and grainy; pores small and almost undefined; although very plainly visible in some specimens. Breaks in short splinters, shavings very fine, compact, flexible and curled. Owing to its grainy fiber, it does not admit of much flexion; it breaks before bending much. Padre Blanco says of this species: 'It is very hard and brittle, and easily sawed and worked; but it may contain holes and knots, making it harder to work.' On account of its durability, ease with which it is worked and abundance, it is preferred in construction above all other species; it resists the weather and lasts well under water and is not injured by contact with lime. Employed in the construction of partitions, it gives the whitewash a yellowish tint, which is not agreeable.

Although not entirely free from attacks by the anay, it serves only as a temporary refuge, whence it transfers its operations to a more desirable wood.

Its excellent qualities have obtained for it the name of 'Queen of the Philippine Woods,' and formerly it was thought that it could not be substituted.

It grows to a height of more than twenty meters, but not always straight. It is found in plenty in all the Islands of the Archipelago, excepting some provinces in the north and center of Luzon. Trees of large dimensions, however, are getting scarce in places where they may be easily removed.

Molave from Tayabas is liked best in the market. It is found in abundance in the forests of Laguimanoc, Calilayan and Pitogo.

In the markets of China the Molauin aso and the Sindano are passed off as Molave; the Yacal is called Gray Molave, and the Mangachapui White Molave. The identity of the wood can be established by a very simple experiment, viz: treated with lime it exudes a yellow resin, which soon hardens; the same results obtain even when the wood has been cut many years.

Señor Cortes made following tests:

LOCALITY.	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS	LOCALITY	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS
Cavite	2.	1.252	233.5	0.591	Misamis	1.2	1.600	264.5	0.934
Bataan	3.0	1.072	121.5	0.866	Mindoro	2.2	1.264	216.	0.896
Tayabas	2.8	1.248	238.	0.870	Bulacan	1.3	1.890	208.5	0.848
Pangasinan	1.5	1.232	221.5	0.874	Leyte	1.3	1.732		
Nueva Ecija	1.4	1.432	212.	0.522					

D. VIDAL."

Gives logs up to thirty-five feet long, by twenty-five inches square; it resists sea worms, white ants, action of climate, and consequently is specially valuable for work on the surface of or under the ground, and generally for all purposes where an extra strong and durable wood is required. Often growing crooked, it is commonly used where produced and in adjacent countries, for frames of vessels. Owing to its imperviousness to ligniperdous insects and climate, it cannot possibly be surpassed for such purposes as railway sleepers. This wood is practically everlasting, and is deservedly called by the natives, 'Queen of the Woods.'

FOREMAN."

"Grows from eleven to twenty-two feet long, and twelve to twenty-four inches square. Special lengths of thirty and even thirty-five feet may be obtained at considerably extra cost, but only to a limited extent. Resists sea worm, white ants, action of climate, and lime, and consequently is specially valuable for work on the surface of, or underground, where contact with lime is necessary, and generally for all purposes where an extra strong, and durable wood is required. Often growing crooked, it is universally used (where produced, and in adjacent

countries) for frames of vessels, and owing to its resistance to lime, insects, and climate, it cannot possibly be surpassed for the purpose of railway sleepers.. This wood is practically everlasting, and is deservedly called by the natives 'Queen of Woods.' The severest tests are invited. BROWN."

"Leaves compound with three to five leaflets on common petiole; leaflets lance-shaped, somewhat hairy on the margin and the mid rib. Petiole short, with a knot near its middle from which it doubles a little the other way. Flowers verticillate in panicles. Calyx very small, erect, bell-shaped, with three or four teeth. Corolla with two lips, bell-shaped, the tube curved and dilated above, the upper lip emarginate; the lower lip three-parted; the middle part the largest; the throat and palate woolly. Stamens grouped two by two, hairy on the lower part. Anthers of figure of half moon. Style of same length as stamens. Stigma bifid. Drupe small, globular, with one nut, as in the other species.

This tree attains a height of more than fifty feet and is very often crooked. It is prized above all other woods in the Philippines and is very generally used. It is prized for all kinds of construction. Houses made from the Molave and also from Ipil or Balayon are very cold. It is somewhat of a straw color and when worked smells like honey. It is very hard and brittle; and thus it can be easily sawed and worked, but it sometimes contains holes and knots, making it more difficult to work. Placed in the ground, water, or lime, it lasts a very long time.

The Molave, a wood so precious, and so much sought after, grows everywhere, for it is nothing else than that which is known in this country as Lagundi, which grows so large in the forests as to lose its identity and be called Molave. The species which has a knot in its petiole is not very common. I have seen it in the forests of San José in Batangas. The fine sawdust of the Molave has been used with happy effect in wounds, no matter how large they be; it is applied to the blood and left there until it falls off. The Indians have a numerous list of remedies for such cases, and it may be said they cure wounds with almost anything, as I have witnessed many times.

An infusion of this wood produces a very pretty straw color, but it is not lasting. P. BLANCO."

"The Molave was referred by Naves to the Vitex altissima of Linneus, and by Schauer to V. timoriensis Walp.; but on comparison with specimens in the Kew herbarium, it was found to be identical with Vitex littoralis, the 'Puriri' of New Zealand, sometimes called 'New Zealand Teak,' the timber of which has long been known commercially and highly valued for its endurance under water.

LIEUT. SAFFORD, U. S. N."

"TREE OF THE FIRST MAGNITUDE.—Grows to a height of more than twenty meters in the Philippines, where it grows spontaneously; it is considered on account of its fine qualities one of the best woods.

COLOR.—Sometimes yellowish, sometimes greenish yellow, and at other times ashy.

TEXTURE.—Very compact and fine, pores small, in some pieces scarcely perceptible; the fibers generally very compressed.

ODOR.—Somewhat acid, sometimes scarcely perceptible; an infusion of it in water colors the water yellow. Has a slightly bitter taste; breaks in short splinters; the shaving is fine, compact, flexible and curled.

SALVADOR CERON, p. 294."

NARRA.

Pterocarpus indicus, Willd.
Pterocarpus pallidus, Blanco.
Fam. Leguminosæ.

SYNONYMS—Narra, Sanque, Naga, *Visaya;* Naga, *Ilocano;* Asana, Narra, *Tagalog;* Naga, *Vicol;* Apalit, Daitanag, *Pampanga;* Taygat, *Ibanac;* Antagan, *Cagayan;* Burmese Rose Wood, *Burma;* Andaman Red Wood, Padouk, *Andaman Islands;* Kiabooca Wood, Lingo or Lingao, *Singapore.*

WHERE FOUND—Islands of Leyte, Luzon, Masbate, Mindanao, Mindoro, Negros, Panay, Paragua, Samar.

DESCRIPTION—*Superior Group.*

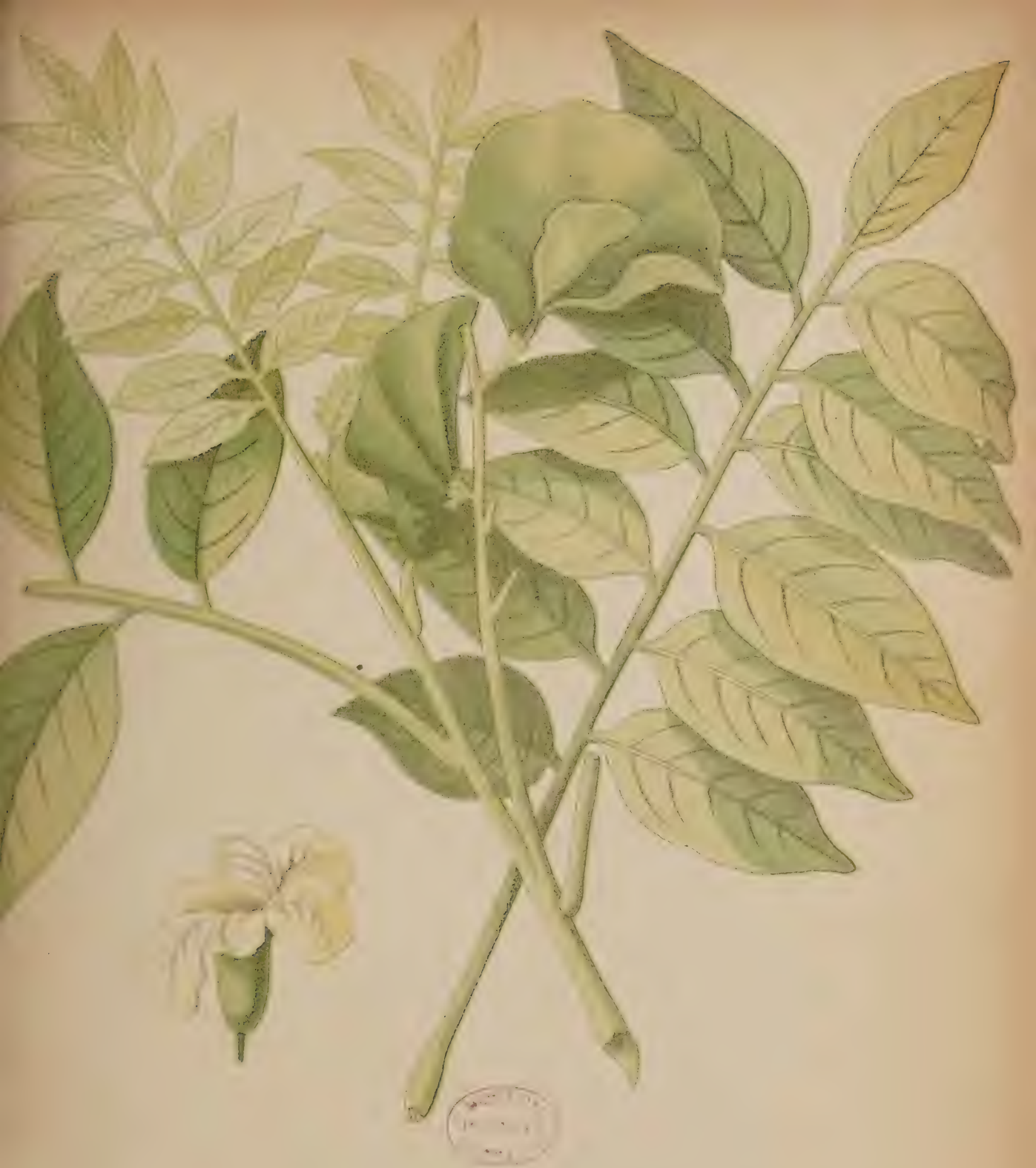
"COLOR.—Male, rose color; female, white.

ODOR.—Aromatic.

We might say that the wood called 'Asana' or 'Naga' is the little sister of the Tindalo, equal to it in beauty and grandeur. In the Tagal language, it is called Asana; in the Visayan, Naga or Narra. In this country are found large trees of both species. Very long and wide planks are sawed from them, one plank being wide enough to form a table or door. They form practically virgin forests. The Visayans do not cut the largest trees, having no use for them. In an apartment of the College of Manila, there is a very large rectangular table brought from the Visayas, which was made while I was in that college. The Naga can be used for the same purposes as the Tindalo. It is very durable and impervious to decay, to such a degree that it denudes itself of the aramay (diseased white wood sometimes found next to bark), resists well the action of the climate, for which reason it can be used for posts in house construction, also for rafters, cross pieces and boards.

It has medicinal properties, placing water in a small vessel made of this wood, imparts to it a sky-blue color, and has a perceptible odor; it is given to persons suffering with dropsy, gravel or stone in the bladder. It is certain that *ciet urinam et corroborat intestina*, and it without doubt has other medicinal properties, with which I am not familiar. Bees make a very red and excellent wax from the flowers of this tree.

The city of Nueva Caceres is called by the Indians 'Naga,' on account of the abundance of these trees in the provinces of Camarines and Albay, where they



NARRA.

Pterocarpus indicus, Willd.
Pterocarpus pallidus, Blanco.
Fam. Leguminosæ.

Atlas, Sinopsis, Flora Forestal de Filipinas, S. Vidal, lám. XL, A. figs. *1*, *2*, *3*.

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make very curious drinking cups. The cups made from the female species are the better, as they give a blue tinge more quickly to the water. They are highly valued in Europe, and one is a gift fit for a prince. In Cadiz when a child, they gave me a drink from one of these cups, as a remedy for dropsy or chlorosis, with which I was suffering, and I think I would have been benefitted had I not taken too much. Some say that the red liquor which exudes from this tree, and which is very astringent, is dragon blood.

I think that this comes from another tree called Drugon by the natives, which signifies wood which contains blood. Be that as it may, I think I have said enough to show that the Naga or Narra is a very valuable wood.

DELGADO."

"TREE OF THE FIRST ORDER.—Abounds in all parts of the Archipelago.

COLOR.—Carnation to blood red.

ODOR.—Agreeable.

TEXTURE.—Solid, very brittle, fibers united, being twisted in proximity to the pores, which are well defined; it admits of a fine polish, has a beautiful appearance, and breaks into short splinters. It is very much used in cabinet making, and is the material from which nearly all the furniture in Manila is made; it is also used in civil construction, pieces of large dimensions coming from the forests of Nueva Ecija and Pampanga. It is also used in Malabon for making cascos. It is inferior to Mahogany on account of its porosity. It is not often attacked by the anay. Very large planks are sometimes sawed from its roots, which divides it into compartments of such a size, as to give an erroneous idea as to the size of the tree.

Among the notable planks of this class meriting mention is the one belonging to D. Caoto de Olana, and which received a premium at the Philadelphia Exposition. There is a very remarkable one in Cebú, and if my memory is correct, General Alaminos was offered one twenty-two to twenty-six feet long and two or three yards wide.

Señor Cortes made following tests:

LOCALITY	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS	LOCALITY	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS
Bataan	2.2	1.296	168.5	0.653	Negros	1.5	1.200	159.5	0.605
Nueva Ecija	1.7	1.280	174.	0.654	Bulacan	1.7	1.440	188.5	0.612
Mindoro	2.3	1.056	168.	0.645	Leyte	2.	1.595		

D. VIDAL."

"It gives logs up to thirty-five feet long and twenty-six inches square. It is the mahogany of the Philippines and is always employed in Manila in the manufacture of furniture, for notwithstanding its somewhat open grain, it polishes well, and is prettily marked. There is a variety of shades in different logs, varying

from straw color to blood red, the former being more common; all are, however, equally valued. It is a first-rate wood for general purposes. In the London market it is classed with the Padouk of Burma. FOREMAN."

NAGGA AND AGANA.

DESCRIPTION—*Superior Group.*

"TREE OF THE FIRST ORDER.—Plentiful in all parts of the Archipelago.

COLOR.—Carnation to blood red.

ODOR.—Agreeable.

TEXTURE.—Solid, very brittle, fibers united, twisted in proximity to pores, which are well defined; it takes a fine polish, has a beautiful appearance and breaks into short splinters. It is very much used in cabinet making, and is the material from which nearly all the furniture in Manila is made.

The elasticity is 0.0037 m.; weight required to break each piece 31.286 kilograms; weight in open air 8.240 grams, and specific gravity 0.634. S. VIDAL."

NARRA BLANCA, NARRA AMARILLA.

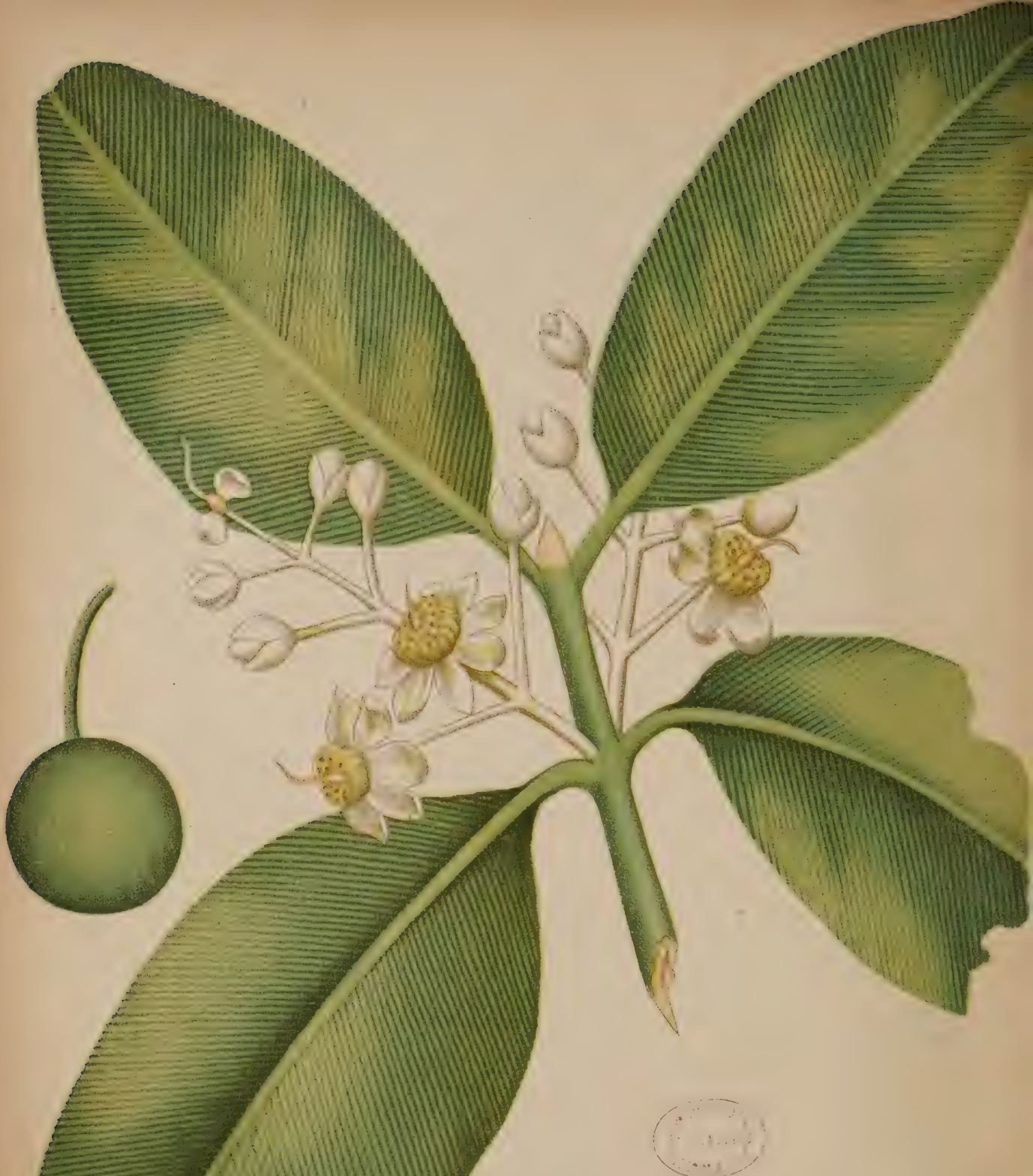
SYNONYMS—Asana, *Tagalog;* Naga, *Visaya;* Daitanag, *Pampanga.*

DESCRIPTION—*Superior Group.*—This may perhaps be only a variety of the former species.

"COLOR.—Ochre yellow with gray grain, which becomes dark in time, acquiring a gray-yellow color; there are intermediate tints from the red color of the common Narra to this.

TEXTURE.—Fine; pores less marked than in the other. Breaks in long splinters. That from the forests of San Antonio, province of Tayabas, where it is called Asana, has a clearer color, and breaks into short splinters. Both species produce, when tapped, a juice of a brilliant carnation color, the 'Santalina,' which is utilized for dyeing, and in the composition of varnishes. It is plentiful in many provinces. It is used in cabinet making, but is not so highly valued as the other; it is also used for doors and windows. D. VIDAL."

"Grows from eleven to twenty-two feet long and twelve to twenty-two inches square. Special sizes from thirty to thirty-five feet and twenty-four to twenty-six inches square. It is the mahogany of the Philippines, and is always employed in Manila in the manufacture of furniture, for, notwithstanding its somewhat open grain, it polishes well and is prettily marked. There are a variety of shades in different logs, varying from straw to blood red, the former being more common; all



PALO MARIA.

Calophyllum inophyllum, Linn.

Fam. Guttiferæ.

Atlas, Flora de Filipinas, Blanco, lám. 34.

are, however, equally appreciated. It is a first-class wood and may be used for any purposes where good timber is necessary. BROWN."

"Leaves opposite, sometimes alternate, pinnately compound with terminal leaflet. Leaflets ovate-acuminate, entire, smooth and somewhat stiff. Flowers yellow, in panicles. Peduncle long. Calyx with five teeth, two above and three below. Corolla papilionaceous, twice as long as the calyx. Upper petal wide, of same length as the lateral petals and which terminate in a claw at base. Side petals fixed at the base, each one by a thread. Keel linear, emarginate or notched at the apex, and has two lobes at the base, where it is attached by two threads. Stamens ten, forming a tube with two longitudinal grooves on opposite sides; one extends to the base, the other not quite so far; each part of the tube is divided into five equal filaments. Style as long as the stamens. Stigma awl-shaped. Legume membranous, almost circular, veined, very much compressed with a broad keel or ridge that extends around the entire edge, and with four or more seeds separated by partitions. P. BLANCO."

"TREE OF THE FIRST MAGNITUDE.—Grows spontaneously in the mountainous parts of the Philippine Archipelago.

COLOR.—From a deep red to a blood red.

ODOR.—Agreeable.

TEXTURE.—Compact and brittle; fiber united and twisted; pores are clearly defined; it polishes well; breaks in short splinters.

It is used for various purposes in construction, more especially in cabinet making, the greater part of the furniture of Manila being made of it.

SALVADOR CERON, p. 296."

PALO MARIA.

Calophyllum inophyllum, Linn.
Calophyllum inophyllum, DC.
Fam. Guttiferæ.

SYNONYMS—Palomaria, Bitanhol, Dincalan, *Tagalog;* Dancalan, Bitaog, *Visaya;* Bitaog, *Pampanga;* Dancolan, *Cagayan;* Bitaocy, Pamitlain, Biroy, *Ilocano.*

WHERE FOUND—Islands of Leyte, Luzon, and Mindoro.

DESCRIPTION—*Second Group.*

"TREE OF THE SECOND ORDER.—Abundant in nearly all the Islands of the Philippine Archipelago.

COLOR.—Light red.

TEXTURE.—Fibrous, with large elongated pores, breaking in the middle in long splinters; the shaving is rough and much curled. I have seen gigantic trees

of this species dominating in the woods of the south of Mindanao, associated generally with the Guijo. It is chiefly used in naval construction for masts; it does not last long in contact with lime. Elasticity indicated by an elongation of 0.0035 m.; breaks at a limit of resistance with a weight of 35.586 kilograms; weight in the air 7.290 grams, and specific gravity 0.571. There are two varieties distinguished by their color: the red, which is most esteemed, and the white. They are not, however, very well defined. From experiments made with good specimens of the red, an elasticity of 0.004 m. has resulted; maximum resistance 36.3347 kilograms; weight in air 8.854 grams, and specific gravity 0.703.

S. VIDAL."

"In Samoa this tree is much prized by the natives, who call it Fetau. In Tahiti it is called Tamanu and in Hawaii it is one of the two trees called Kamani. In Guam its name is Daok, but it is there also called Palo Maria by the natives, who use its wood almost exclusively for the solid wheels of their carts, and the resin which exudes from incisions made in its bark as an ingredient for incense and for medicinal purposes. LIEUT. SAFFORD, U. S. N."

"A tree of great economical importance widely spread in tropical Asia and through the Islands of the Pacific. It sometimes attains the height of eighty to one hundred feet, and twelve feet in girth. A gum resin exudes from the bark of the tree, which is one of the kinds of tacamahaca of commerce. The fruit is the size of a walnut; it has a fleshy rim containing a hard-shelled seed enclosing an oily kernel from which an oil is expressed. In India this is called Bitter Oil. In Fiji it is called Dilo, and is used by the natives for anointing their bodies.

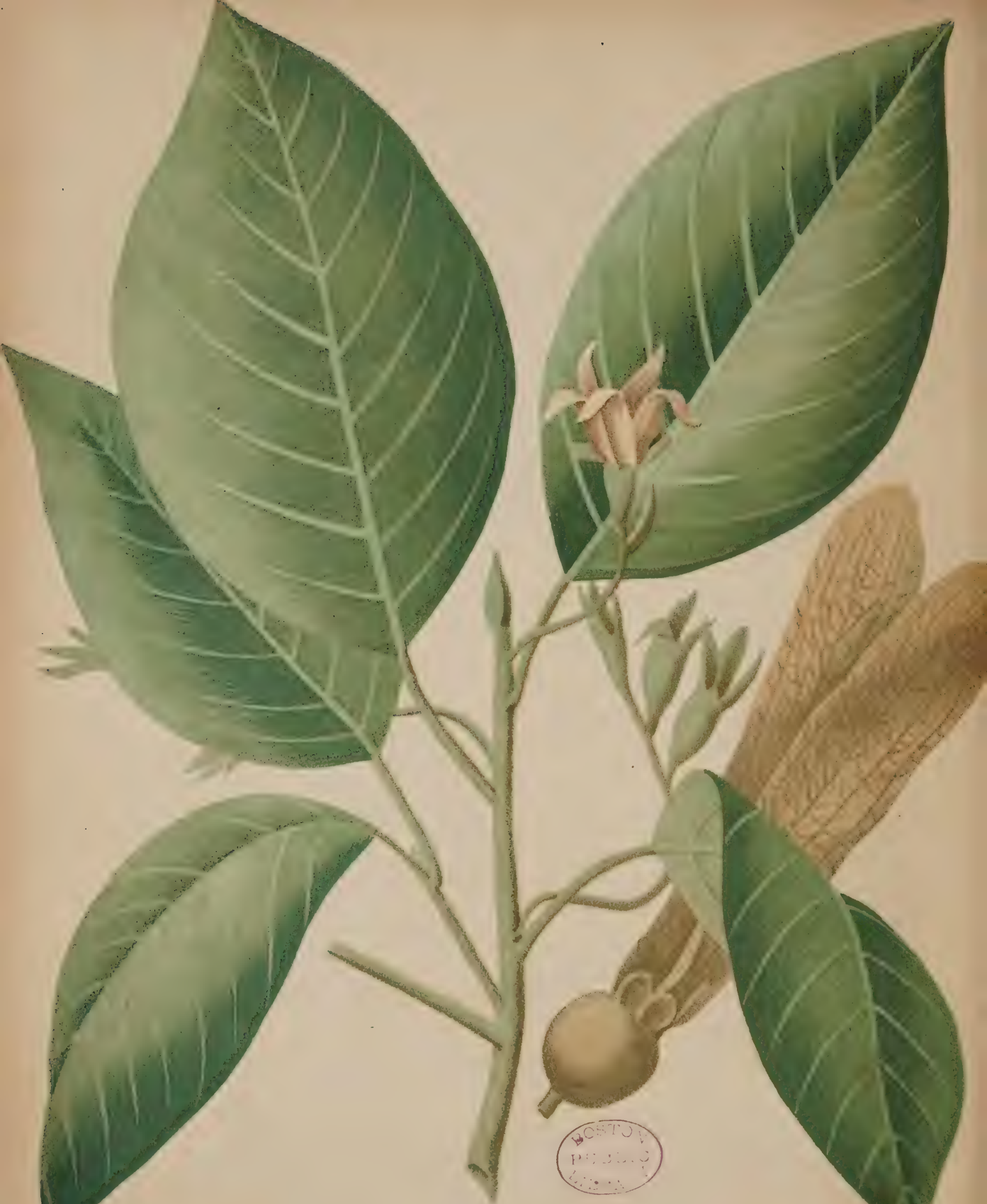
The following is Padre Blanco's description of it:

Leaves opposite, oval, with emarginate apex, very smooth, rather stiff, with a prominent mid-rib, from which a great many delicate transverse little veins extend (feather-like) to the margin. Petioles very short, racemes seven- to nine-flowered. Peduncles long. Sepals four,(?) of the same color as the corolla (white), concave, obovate, two opposite ones longer than the other two. Petals four, obovate concave, somewhat emarginate at the apex. Stamens numerous, inserted in the receptacle, divided into four or more groups, with an occasional solitary. Style one, longer than the stamens. Stigma piltate. Drupe superior, round. Nut pretty hard, bony, covered within with a thicker substance somewhat spongy and soft, containing one seed of the same shape. BLANCO, p. 428., 2nd ed."

"TREE OF THE SECOND ORDER.—Abundant in almost all of the islands of the Philippine group.

COLOR.—Clear red.

TEXTURE.—Fibrous with large, long pores; breaks in long splinters; shaving is rough and much curled. It is used in ordinary construction and in naval for masts, cross pieces, etc., of vessels. SALVADOR CERON, p. 304."



PANAO-BALAO.

Dipterocarpus vernicifluus, Blanco.
Dipterocarpus hispidus, F. Villar.
Fam. Dipterocarpeæ.

Atlas, Flora de Filipinas, Blanco, lám. 35.

PANAO-BALAO.

Dipterocarpus vernicifluus, Blanco.
Dipterocarpus hispidus, F. Villar.
Fam. Dipterocarpeæ.

SYNONYMS—Paimo, Malapaho, Panao, Balao, *Tagalog*.

WHERE FOUND—Islands of Leyte, Luzon and Mindoro.

DESCRIPTION.—*Third Group.*

"A tree which sometimes figures in the first order, but as a general rule does not pass the second.

In Manila, when it comes from Camarines, the name of Supa is given it. It is of a light yellow or ashy-green color, with ash-colored spots. It has also sometimes a light-reddish and yellow-reddish tint. Its texture graduates from soft to hard; but generally hard. It is fibrous. It breaks with a long and sometimes a short splinter; pores not very well marked. It is very much used in the Visayas, and other places as rafters, uprights, etc., in buildings, and in naval construction for bottoms of vessels and sometimes for bancas. Upon making an incision into the tree there exudes an oil called Malapaho, Balao or Marapap, which is used for mixing with paint and preserving wood from the insect known as anay. The reddish yellow varieties of hard texture are sometimes passed off as Ipil, to which it is very inferior; upon close examination it can be readily distinguished on account of its size and the appearance of its pores. It is found in nearly all the provinces. I have examined specimens from Tayabas, and with the following characteristics, viz: straw color, pores visible and growth circles well defined, quality good, wood heavy, shavings and splinters short.

Señor Cortes made following tests:

ORIGIN	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS	ORIGIN	ELASTICITY LINES	BREAKS AT OUNCES	WEIGHT IN AIR GRAINS	SPECIFIC GRAVITY GRAINS
Mindoro.....	1.8	1.360	136.5	0.526	Leyte.....	2.	1.032	.....	.....

D. VIDAL."

"Gives logs up to forty feet long by twenty-eight inches square. It produces an oil and is a strong wood for many purposes, polishes well and can be used advantageously for house decoration and furniture. FOREMAN."

"Leaves alternate, wide, lanceolate, downy underneath and stiff. Petioles short, swollen at the two extremities. Flowers terminal in spiked racemes. Calyx inferior, fleshy, tubular, with four or five sides terminating with two long divisions

with one or two very small ones intermediate. Corolla fixed on the receptacle, bell-shaped almost as long as the calyx, deeply divided in five parts. Stamens, more than twenty, fixed on the receptacle. Filaments very short. Anthers long, awl-shaped and without bristles. Ovary issues from receptacle. Style same length as stamens. Stigma apparently divided into two parts. Nut globular (like a filbert) not joined to the calyx, but covered and very close to it and crowned with the parts of the same calyx, well developed, of which two are very large, and the other two alternate ones, short and rounded at the extremities.

See General Appendix—Dipterocarpeas.

Well-known tree, wood hard. It produces the resinous and odorous fluid known as Malapaho and Balao, which is used as a varnish.

It is common in Visayas and in many Tagal districts. The resin flows very abundantly. The parts of the calyx which have the appearance of big wings are five inches long. The tree called Hagachac in Leyte produces an odorous, resinous fluid similar to this but it is not the same. Where the trees are plentiful the natives use this fluid for illuminating purposes.

They pour this fluid into a joint of cane and light it, the resin and the cane being consumed at the same time.

Flowers in June. BLANCO, p. 314, 2d ed."

SUPA.

Sindora Wallichii, Benth.
Fam. Leguminosæ.

SYNONYM—Supa, *Tagalog.*

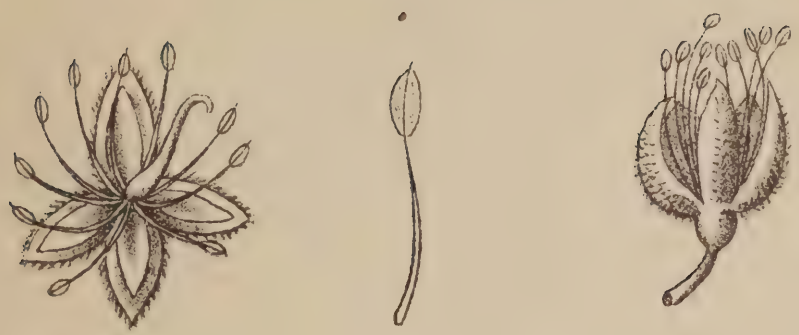
WHERE FOUND—Islands of Luzon, Leyte, Mindoro.

DESCRIPTION—*Second Group.*

"TREE OF THE FIRST ORDER.

COLOR.—Dirty ochre yellow, which in time changes to a yellowish gray; there are also specimens of a reddish tint. Very similar to Ipil; it substitutes the Ipil in ordinary and naval construction but is less esteemed.

It deserves special attention, for the engineer should know it well to distinguish it from Ipil and thus prevent frauds, which unfortunately are of frequent occurrence. In the two species which I have before me, I note that in the Ipil the pores are distributed over the entire surface of the rings, while in the Supa they are numerous at their termination and scarce in the other parts; the medullary radii fine and more marked than in the other species. The color varies in both, but generally is more uniform in the Ipil. The Supa may sometimes have narrow grains of a dark gray color which extend along its entire length. It is abundant in the center and south of Luzon and in the Visayas. I do not know of any experiments made to determine its elasticity, maximum resistance, weight in the air and specific gravity. I cannot make this experiment for want of appropriate specimens. S. VIDAL."



SUPA.

Sindora Wallichii, Benth.

Fam. Leguminosæ.

Atlas, Sinopsis, Flora Forestal de Filipinas, S. Vidal, lám. LXIII, C.

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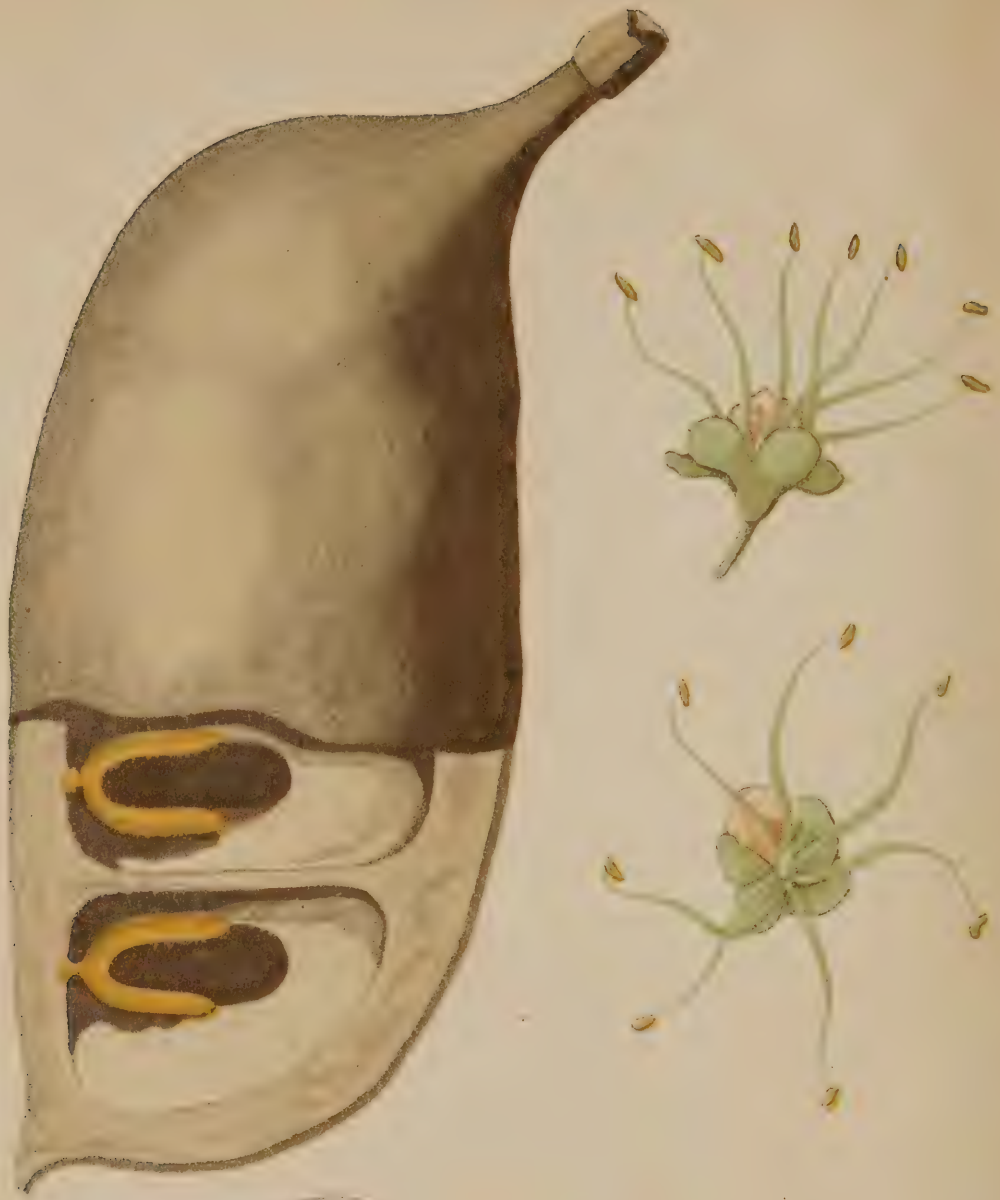


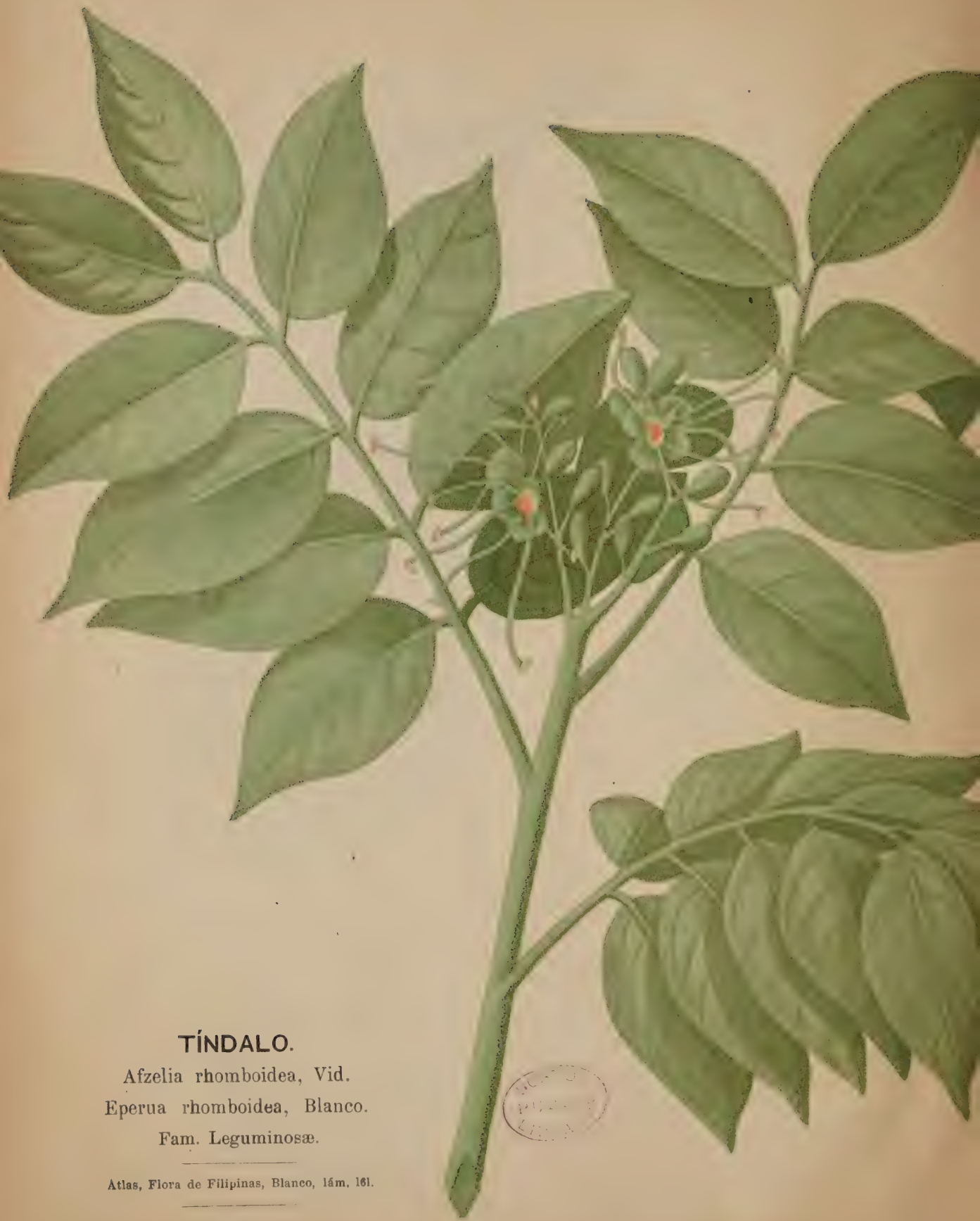
TÍNDALO.

Afzelia rhomboidea, Vid.

Eperua rhomboidea, Blanco.

Fam. Leguminosæ.

Atlas, Flora de Filipinas, Blanco, lám. 161.



TÍNDALO.

Afzelia rhomboidea, Vid.

Eperua rhomboidea, Blanco.

Fam. Leguminosæ.

Atlas, Flora de Filipinas, Blanco, lám. 161.

"TREE OF THE FIRST ORDER.

COLOR.—A dirty yellow ochre, which in time changes to a gray yellow; there are also specimens of a reddish tint.

Very similar to Ipil and is a substitute for it in ordinary and naval construction but is not equally esteemed.

It is necessary to know this wood to prevent its substitution for Ipil, which is frequently done. In comparing the Ipil with the Supa, it will be observed that in the first species the pores are distributed over the entire surface of the annual rings, while in the Supa the pores are numerous near the edges and scarce in the other parts; the medullary rays are fine and more marked in the Supa; the color of both species is variable; as a general rule is more uniform in the Ipil. The Supa sometimes has a narrow dark grain which marks the limits of the annual growth. It is much used for ordinary and naval construction. It is plentiful in the forests of the center and south of Luzon. SALVADOR CERON, p. 306."

TINDALO.

Afzelia rhomboidea, Vid.
Eperua rhomboidea, Blanco.
Fam. Leguminosæ.

SYNONYMS—Tindalo, *Tagalog;* Balayong, *Blanco;* Barayon, *Blanco;* Barnion, *Visaya;* Magalayao, *Isabela de Luzon.*

WHERE FOUND—Islands of Luzon, Mindanao, Bohol, Cebú, Masbate, Mindoro, Negros, Samar.

DESCRIPTION—*Superior Group.*

"Among the many magnificent woods found in the forests of these Islands, one of the most useful and precious is that which the Tagals call Tindalo, and the Visayans, Barnion. It can be used in all kinds of construction. For some purposes it is superior to the Molave; it is of a red color and with time takes on a darker hue. It is found on all the islands and more especially in the Visayas, where are found very large, straight and tall trees.

In the Island of Poro, I built a house; the sills, roof supports and boards were of this select timber, being very plentiful there; and I also built one in Leyte of Molave, which, if not consumed by fire, will last forever.

Beautiful desks and large tables which are highly esteemed are made from this wood; also, very unique chairs and stools, railings and bedsteads artistically turned; magnificent planks are also sawed from it. It is very durable when exposed to the weather; for inside construction it forms one of the most valuable jewels of a house, where it remains permanently, and impervious to decay. It is very much esteemed in Manila; but more so in China, where they say it sells for its weight in silver and is valued as such; they make from it many curious desks,

chairs and stools. They also know how to preserve in the wood a blood red color, washing it frequently in salt water. In time if care is not taken, it changes to a dark color, but is very lustrous; it can be polished to such a degree that one's face can be seen in it. It also has aramay, and it is necessary to remove this when working it, although it sometimes hardens and lasts equally as well as the heart of the tree, still being more spongy, may decay and be attacked by the wood louse.

Such an excellent wood, no doubt, has medicinal properties which the doctors in the art can learn by making an analysis; a decoction made from it would be beneficial in cases of dysentery and internal ulcers, as it has strong astringent, antiseptic and healing properties, as is indicated by its odor and taste.

DELGADO."

"FIRST ORDER.

COLOR.—Light red to deep red, when recently cut; later it takes on a darker color, and in time becomes nearly black. Some specimens have an uniform color, others with grain and border darker.

ODOR.—Agreeable.

TEXTURE.—Solid; fiber somewhat crossed diagonally; pores disposed according to construction of fiber; breaks as if almost brittle, and sometimes in short splinters; the shavings are rough, very porous and not curled. It is abundant in many localities. It is very little employed in domestic and naval construction, on account of its scarcity as dimension timber, but is used in the manufacture of fine furniture. It does not rot when exposed to the action of the weather, but does when placed in the ground. The anay sometimes attacks it, but does not penetrate the wood, nor damage it, but destroys the part buried in the ground.

Señor Cortes made the following tests:

ORIGIN.	ELASTICITY LINES.	BREAKS AT OUNCES.	WEIGHT IN AIR GRAINS.	SPECIFIC GRAVITY GRAINS.	ORIGIN.	ELASTICITY LINES.	BREAKS AT OUNCES.	WEIGHT IN AIR GRAINS.	SPECIFIC GRAVITY GRAINS.
Pangasinan.....	1.5	1.626	245.	0.867	Mindoro	2.	1.184	167.	0.616
Misamis	1.	1.776	227.	0.851	Bulacan.....	1.	1.600	186.	0.857

D. VIDAL."

"Sebastian Vidal gives same description, with following as result of experiment: elasticity 0.0034 m.; it breaks with a weight of 39.539 kilograms; weight in the air 10.749 grams, and specific gravity 0.809."

EPERUA—RHOMBUS SHAPED.

"Leaves opposite, no odd leaf at end of petiole. Leaflets, five or six pairs in number, oviform, smooth. Calyx of four sepals; sepals with margins denticulated, bare on edges; the two which are opposite are smaller. Corolla hairy in the lower portion; growing on one side of the calyx, and is composed of one or two

small petals, with claws. Stamens inserted on the calyx from eight to twelve filaments; some of them are very short and sterile. Sometimes three filaments bearing anthers. Pistils, from one to three, of the same length as the stamens. One legume, short and wide, woody and rhombus-shaped, containing from two to seven large seeds covered on both sides half way with a yellow fleshy aril somewhat compressed, oval and with the shell black, leathery and polished.

NEW SPECIES—(See General Appendix *Leguminosas.*)

SYNONYM—Balayon, *Tagalog.*

"First Order.

Generally there is only one seed in the pod which germinates, and although there are generally more than one pistil, the others perish. The wood is of a pleasing red, hard and heavy, but after many years it changes to a black; it is said that by frequently wetting in salt water it preserves its color. It is the wood most highly prized in the Philippines for tables, chairs and other articles, and, when recently worked, it emits an agreeable odor, distinct from the Narra.

It does not decay when exposed to the effects of the climate, but does when placed in the ground. The anay attacks it sometimes, but does not penetrate the wood nor injure it to any extent, except when placed in the ground.

The seeds of Balayon pulverized and mixed with water serve as glue.

The Indian gamblers cut open a Balayon seed, moisten it with water and apply it to the card when split to make the parts adhere. The young Indian girls have a seed set in a piece of silver, and wear it suspended from the neck to preserve them (so they say) from the evil wind. See the genus Afzelia of Persoon, to which no doubt these trees belong and the Genera Parivon and Vonapa of Jussieu.

The stamens are separated; when I wrote this, I did not notice that they were joined.

The variable number of the stamens anthers and pistils should be noted.

P. Blanco, p. 260, 2d ed."

"About the same as Acle in most respects; but is not notable for resisting fire. Useful for general purposes, for house decorations, or furniture. Tindalo is somewhat brittle, and takes a high polish." Brown."

"Tree of the First Order.—Found in various parts of the Philippine Archipelago.

Color.—Clear red when recently cut; it changes to a deep red; in time it

becomes nearly black. Usually has a uniform color, sometimes a darker grain is seen accompanying it.

TEXTURE.—Solid, somewhat crossed diagonally; pores arranged in order of fiber; breaks in short splinters; shaving rough, very porous and not curled. Is used in cabinet making, for fine furniture and also in ordinary construction.

SALVADOR CERON, p. 309."

TAMAUYAN.

Gymnosporia ambigua, Vid ?
Fam. Celastrineæ.

SYNONYMS—Camauyan, Tamauyuan, Camayon, Tamauian, *Tagalog*.

WHERE FOUND—Islands of Luzon and Mindoro.

DESCRIPTION—*First Group*—Large dimensions.

"COLOR.—Varied: in some, a clear reddish tint; in others, violet and a bright brown red; frequently grain is stained and appears with clouds of distinct color.

ODOR.—In some species, very strong and agreeable; others, inodorous.

TEXTURE.—In some specimens very compact, the pores scarcely perceptible; in others, fine, the pores easily distinguished; breaks in short splinters.

Was formerly used in building, but breaks easily, has much sap wood, which in time becomes worm-eaten.

Very little of it at present comes to Manila; it is used for joists and roofing.

This tree is of very rapid growth, found both in the high and low lands and on the banks of the rivers and creeks.

Señor Cortes made following tests:

ORIGIN.	ELASTICITY LINES.	BREAKS AT OUNCES.	WEIGHT IN AIR GRAINS.	SPECIFIC GRAVITY GRAINS.	ORIGIN.	ELASTICITY LINES.	BREAKS AT OUNCES.	WEIGHT IN AIR GRAINS.	SPECIFIC GRAVITY GRAINS.
Bataan.....	1.5	1.800	223.5	761.	Mindoro.....		1.120	227.	880.

D. VIDAL."

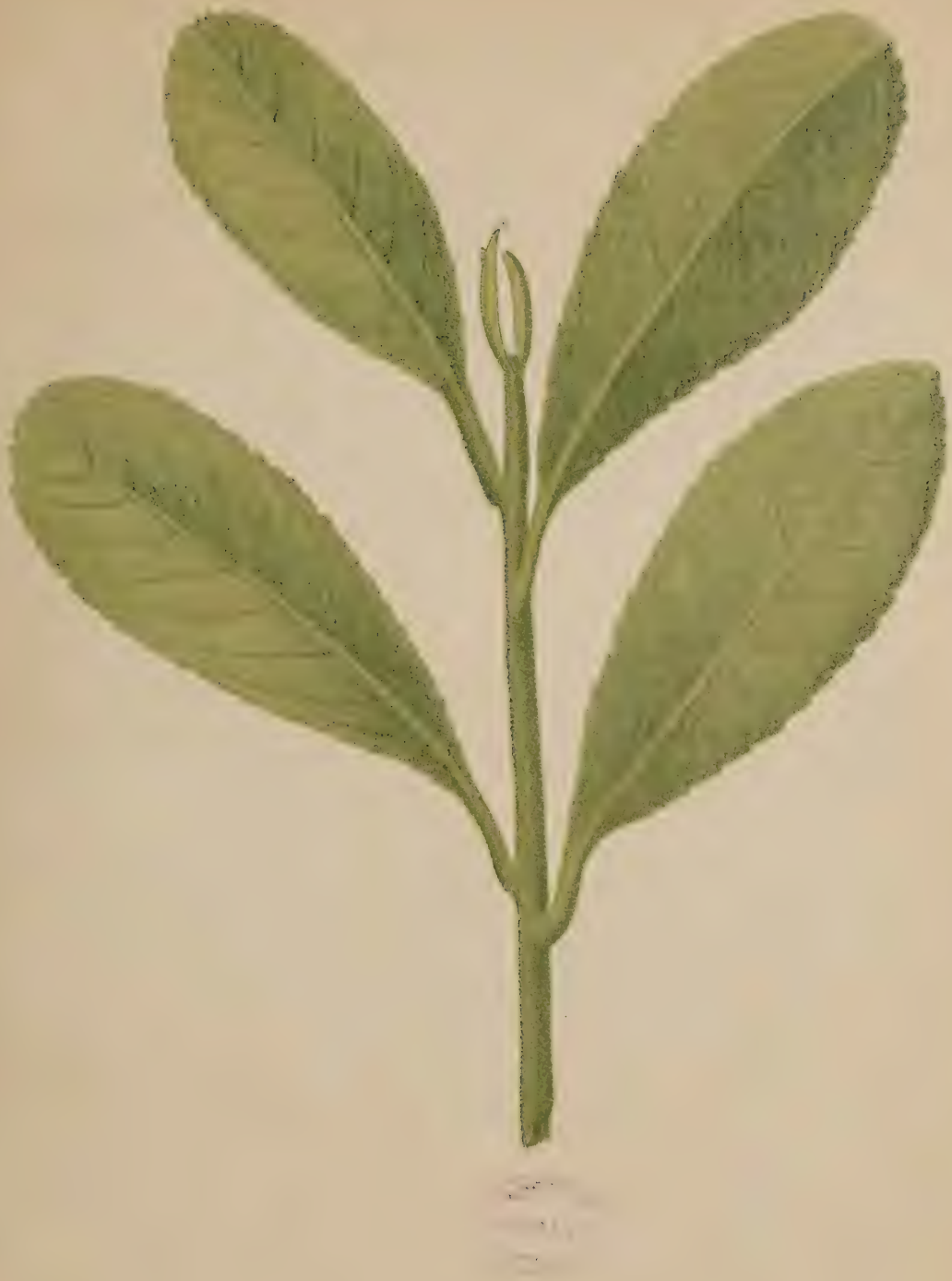
"Attains large dimensions.

COLOR.—Varied: some, light red; others violet; also bright brown red.

ODOR.—In some specimens strong and agreeable, in others inperceptible.

TEXTURE.—In some specimens compact, pores scarcely visible, in others fine, pores distinctly marked. Breaks in short splinters. In domestic construction it comes in as planks and timbers. It is not very much prized.

It is plentiful in many provinces, especially in Luzon (Tayabas, La Laguna,



TAMAUYAN.

Gymnosporia ambigua. Vid. ?

Fam. Celastrineæ.

Made from drawing copied from nature by R. García.

Bataan, etc.). But it is not brought to market in large quantities, as there is not much of a demand for it. S. VIDAL."

"Branches scattered. Leaves alternate, ovate, cradle-shaped, serrated. Can not describe flowers or fruit for want of data. R. GARCIA."

TANGUILE.

Shorea Talura, Roxb.
(Dipterocarpus polyspermus, Blanco.)
Fam. Dipterocarpeæ.

SYNONYMS—Tanguile, Tangile, Tangili, *Tagalog.*

WHERE FOUND—Islands of Luzon and Mindoro.

DESCRIPTION—*Second Group.*

"TREE OF FIRST ORDER.
COLOR.—Brownish red.
TEXTURE.—Very fine with large numerous pores; breaks as if brittle.
Is plentiful in most of the islands, especially in the center and south of Luzon.
It is used in the construction of bancas and is also sawed into lumber.
Elasticity 0.004 m.; weight at which it broke 29.676 kilograms; weight in the air 7.59 grams; specific gravity 0.603. S. VIDAL."

"Leaves alternate, ovate, elongated, membranous and smooth. Petioles very short. Flowers small, terminal growing in panicled racemes. Peduncles very short. Calyx free, in five ovate parts, the two inside covered with the three outside, very long at maturity, especially the three. Corolla, hairy, thrice longer than the calyx, in five sharp parts and hairy on the outside. Stamens less than twenty, inserted between the ovary and the base of the corolla and shorter than the petals; some are inserted higher up than others. Anthers somewhat four-angled, terminating in a long hair. Ovary, globular, with angles and situated within the flower. Style awl-shaped. Stigma simple. Berry, two compartments; each contains seed.

TREE OF THE FIRST ORDER.—Canoes are made of it, and it is well known in Pampanga and Balanga. The calyx remains permanently free, even at maturity, and is never adherent. Unlike most of its congeners the fruit has several seeds. BLANCO, p. 312., 2d ed."

"TREE OF THE FIRST ORDER.—Found in the Philippine Islands, especially in Luzon.
COLOR.—Light brown red.
TEXTURE.—Very fine with large and numerous pores; breaks as if brittle.
It is used for canoes and sawed into lumber. SALVADOR CERON, p. 308."

TECA.

Tectona grandis, L.
Fam. Verbenaceæ.

SYNONYMS—Teak, Teca, Ticla, *Tagalog;* Dalondon, Yate, Calayate, Sagunyate, Yati, *Visaya.*

WHERE FOUND—Islands of Panay, Mindanao, Paragua, Negros, Cebú.

DESCRIPTION—*Superior Group.*

"Tree of First Order.—Constitutes the principal wealth of the forests of British India.

It is found in the Philippines, but is little known.

In Mindanao, I saw a few young ones in a clump of trees, near the camp of Santa Fé, near the road that was being constructed between Pollock and Cottabato. The fact that they had neither fruit nor flowers, and my knowledge of the tree being limited to written and pictorial descriptions, perhaps I may be in error; but nevertheless its characteristics coincide in everything with the trees in India.

The following results were obtained from tests made with specimens brought from the eastern coast of the Gulf of Bengal: elacticity 0.0028 m.; breaks with a weight of 38.188 kilograms; weight in the air 8.090 grams, and specific gravity 0.688. That which comes from the Island of Negros, classified as Teca, gives an elasticity of 0.0028; breaks with a weight of 36.232 kilograms; weight in the air 10.75 grams, and specific gravity of 0.816. S. Vidal."

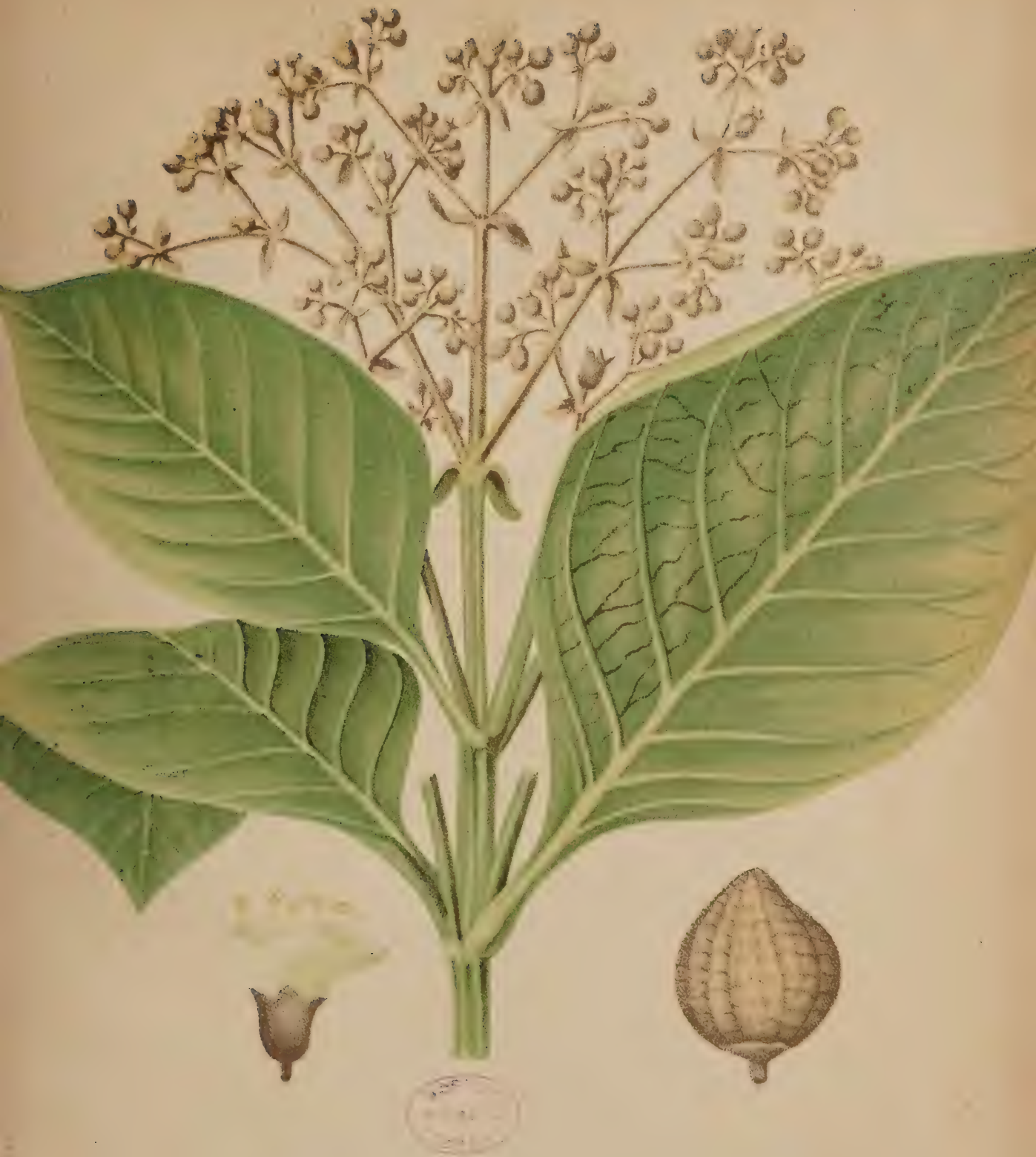
"The best specimens known in the Philippines are in the town of Tanay, District of Morong, growing at the foot of the hills. It is eighty years old, according to the Indians of that locality, and has a diameter of sixty centimeters. There are also specimens of Teca in Ygbarras, in the Province of Iloilo, twenty years old, transplanted by Father Celistino Fernandez Villar in the plaza of that town, and in Panay, in the province of Capiz. R. Garcia."

"The first information I had of this tree was of the one growing at Tanay in Laguna de Bay. Formerly there were two planted by a Franciscan priest. It is not known where he got the seed.

In the history of the travels of the Abbé Prevost, it is said that from the leaves of this excellent tree, which are two hands wide, is produced a red dye, and it is certain that a liquid of a purple color exudes from them. A gargle made from this gum dissolved in water is excellent for an ulcerated throat.

But the principal importance of this tree is its use in the construction of houses and vessels; it is very durable and of good dimensions. It is common according to late reports in some provinces of the Visayas, in the Islands of Negros, Zambales, Mindanao and Butuan.

The tree, the flower of which I have seen, is in Tanay; it was twenty-four years in flowering.



TECA.

Tectona grandis. L. f.

Fam. Verbenaceæ.

Atlas, Flora de Filipinas, Blanco, lám. 340

Leaves nearly round, extend along the petiole; are rough, especially on the upper side. Petioles very short and compressed. Flowers in racemes. Peduncles, square. Calyx, bell-shaped, very large at maturity, five-parted around margin, thick. Corolla longer than the calyx (white) bell-shaped, downy with five obtuse divisions. Stamens five to six inserted upon the corolla. Filaments compressed, somewhat longer than the corolla. Anthers, half globular, with a yellow zone below and a black circle above. I have not noticed that it has a nectary.

Ovary situated inside the flower, oval, downy. Style same length as stamens. Two stigmas very thick and short. Drupe, globular, corky, somewhat flat, covered with the calyx, very large, membranous and puffed, contains a very hard nut, with four divisions, each containing a seed. P. BLANCO."

TEAK.

(Bulletin de la Société Académique Indo-Chinoise, 1881, 12^{me} série, Vol. 1.)

"Teak figures in the list of articles exported from Bangkok in quantities nearly equal, but somewhat less than those of last year. The French house of M. Bonneville handles the larger part of this business; the balance is in the hands of Chinese merchants who have the wood prepared by the native sawyers of Hainan and send it squared or in planks to the ports of China or Java. Orders have also been received from India for this wood, for railroad ties.

Large and increasing orders are constantly being received at Bangkok; but as receipts from the interior are not equal to the demand, prices are forced upward.

The wood sawed and prepared for exploitation delivered at the river, costs from three francs to three francs and twenty-five centimes per English cubic foot.

It is very difficult to foresee what quantity of this wood will remain in Siam at the end of the next twenty years. I believe that actually all the forests exploitable have already been exploited; they are undoubtedly immense, and notwithstanding the fact that the growth of the Teak is rapid and attains its full value before sixty years, it is not probable that the renewal of the forests will be complete.

The authorities in charge of all the forests and who exercise a supervision over their exploitation from a fiscal point of view, do not appear to take any precautions for their preservation."

"TREE OF THE FIRST ORDER.—Forms the principal riches of British India. In the Philippines, to judge from the specimens taken from the explored parts of Mindanao, it is probable that these valuable trees are to be found in quantities in the interior of that island.

COLOR.—Grayish.

TEXTURE.—Compact and close grained. Large quantities of this wood are shipped from India for the construction of vessels, being used especially for the sides which are to be armored or sheathed. SALVADOR CERON, p. 308."

URUNG.

Fagræa fragrans.—Roxb.

WHERE FOUND—Paragua.

DESCRIPTION—*Superior Group.*

"These trees are found only in the Island of Paragua, and are similar to Teak. The Spaniards in that locality assert that it contains the same properties. There is an abundance of this species there; specimens being found up to six or seven meters in length and forty centimeters in diameter.

Señor Don Domingo Sanchez, zoological collector of the Inspección General de Montes, who explored that island, and who made a study of this tree, stated that it belonged to the family Lagonicias. It is not to be found in the market.

Trees with cylindrical branches. Leaves with petioles, oblong-lanceolate or lanceolate and obtusely acuminate. Sometimes, but rarely, from the base abruptly cuneate almost elliptical; leathery, three to five inches long, obscurely feather-veined, eight veins on both sides. Blossoms arranged in trichotomous corymbs sometimes terminal (at ends of branches) and sometimes super-axillary. Corolla funnel-shaped, yellowish-white, with an agreeable smell; with the tube conical, and the limb a little longer; divisions of corolla ovate-oblong obtuse. Fruit small, pea-shaped, and round at the base. Style ends in a point, golden color.

R. Garcia."

YACAL.

Hopea plagata, Vidal.
Dipterocarpus plagatus, Blanco.
(The Wounded Dipterocarpus.)
Fam. Dipterocarpeæ.

SYNONYMS—Yacal, Sapolongan, Saplungan, *Tagalog.*

WHERE FOUND—Islands of Luzon, Mindoro, and Panay.

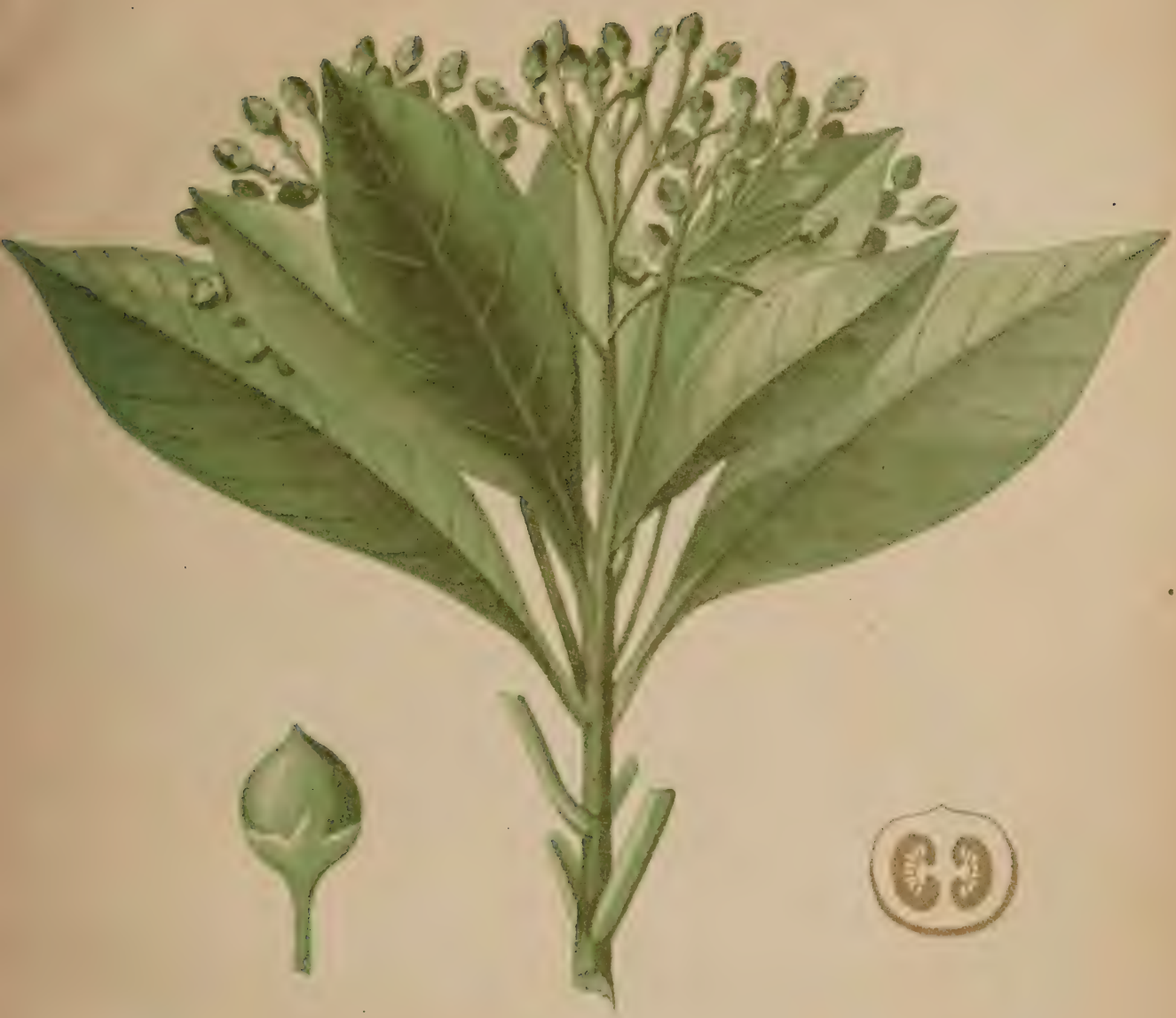
DESCRIPTION—*Superior Group.*

"Attains a height of from twelve to twenty meters, and nearly one meter in diameter.

Color.—Earthy yellow.

Odor.—Similar to Lauan.

Texture.—Solid and fine; breaks in long splinters; shavings, fine, compact and curled. It is abundant in almost every province of Luzon. It is used in the construction of buildings, for pillars, joists, sleepers, etc., and, in naval construction, for beams; also is used in cabinet making. Pieces of large dimensions generally come from Tayabas; but that from Angat is preferred for all kinds of beams,

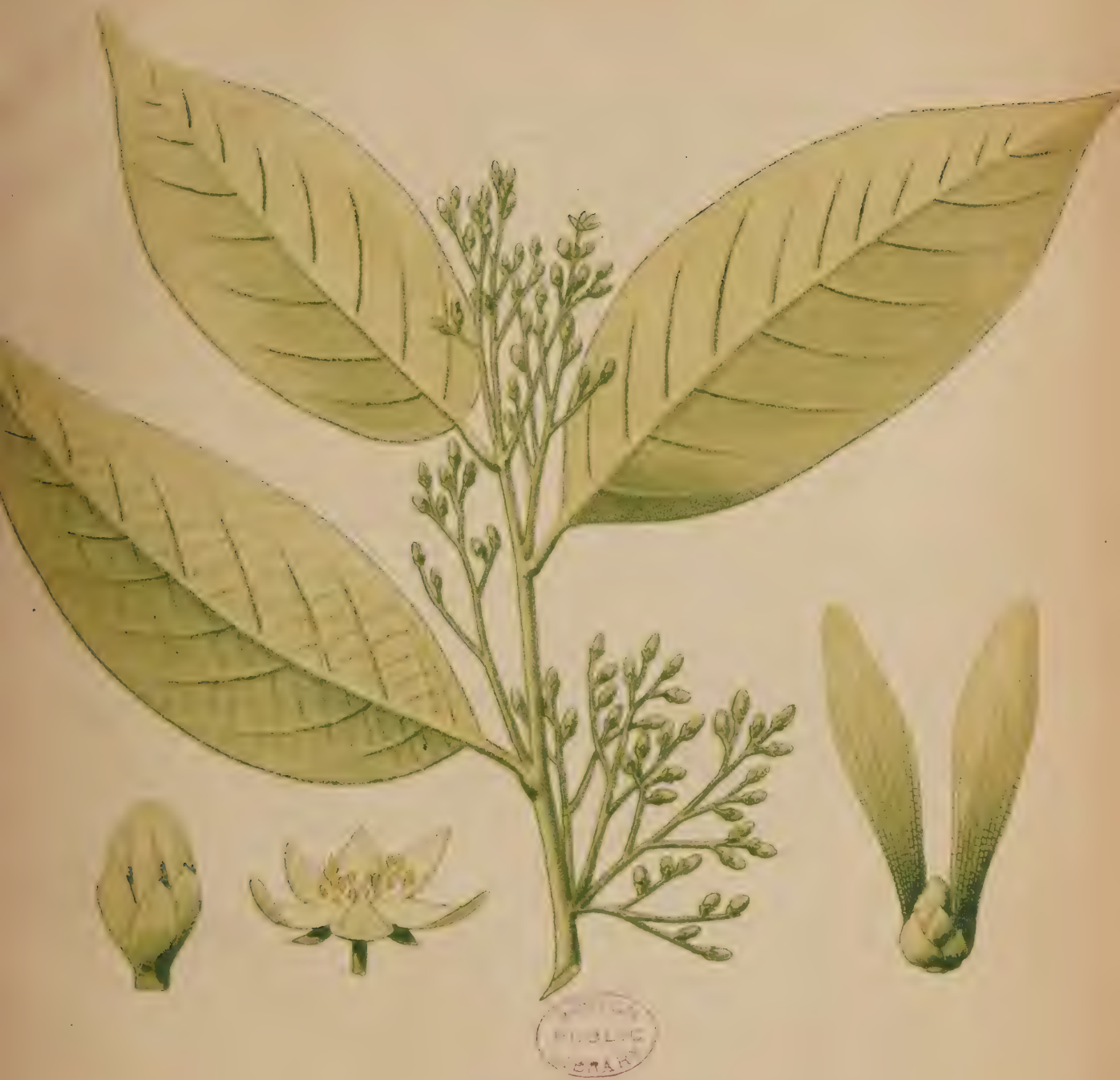


URUNG.

Fagræa fragrans, Roxb.

Fam. Loganiaceæ.

Atlas, Sinopsis, Flora Forestal de Filipinas, S. Vidal, lám. LXIX, A. figs. *1, 2, 3.*



YACAL.

Hopea plagata, Vidal.
Dipterocarpus plagatus, Blanco.
(The Wounded Dipterocarpus.)
Fam. Dipterocarpeæ.

Atlas, Sinopsis, Flora Forestal de Filipinas, S. Vidal, lám. XV.

the grain of which contains long fibers half a vara long. Its transverse resistance is so great that a beam of this wood is preferred to other kinds of double its dimensions. Its transverse strength makes it desirable for rafters, especially in houses with tiled roofs. The demand for this wood has been such that each year the difficulty of getting timbers of the required size increases as the distance of the place of cutting increases from Manila, but there is received here a great quantity of rafters and small beams, in pieces which vary from eight to ten varas in length and five by one and one-half in breadth and thickness, of the first named, and of the second seven by three.

These are made in the forests. After felling a large tree of sixteen or twenty varas in length, it is afterwards cut into two pieces of from eight to ten varas long. These pieces are split easily into two parts by means of iron wedges and heavy wooden mauls. In this manner it is further subdivided, until it is suitable for rafters. A rafter is calculated to be a load for one carabao to haul; a beam is a load for two.

It is launched and formed into what are called panos, or rafts, made by fastening twenty or twenty-four pieces together with canes, and placing on top of this a similar raft to make it float better.

The woodcutters know from experience the proper proportions, making the top three times as broad as the thickness, according to the theory that the transverse resistance of wood is in proportion to its width multiplied by the square of its thickness.

There is a Yacal received from Mindoro of a yellow color, generally cracked and hollow inside. The anay does not attack it; it comes in limited quantities in small dimensions for smaller-sized beams and rafters. The Yacal of Subig deteriorates in ten years, forming a kind of sponge; it comes in small dimensions, and in small quantities. During the last few years there has been coming to this market in logs of large dimensions a wood called Yacal de Pitogo, which is probably another species, and which is used for joists, beams and sills. It is not certain whether the anay attacks it or not. In China the good Yacal is sold under the name of Gray Molave.

Señor Cortés made following tests:

ORIGIN.	ELASTICITY LINES.	BREAKS AT OUNCES.	WEIGHT IN AIR GRAINS.	SPECIFIC GRAVITY GRAINS.	ORIGIN.	ELASTICITY LINES.	BREAKS AT OUNCES.	WEIGHT IN AIR GRAINS.	SPECIFIC GRAVITY GRAINS.
Batuan.....	1.2	1.963	270.	1.203	Nueva Ecija.....	2.	2.016	233.5	0.681
Pangasinan.....	2.	1.232	249.5	0.929	Bulacan.....	1.1	2.464	231.	0.883

D. VIDAL."

"Attains a height of from 12 to 20 meters and a diameter of 0.8 meters.

COLOR.—Earthy yellow.

TEXTURE.—Solid and fine, breaks in large splinters, and gives a fine shaving, compact and curled. It is plentiful in almost all the provinces of Luzon, and is used in the construction of frames of houses, and beams in ships. That coming from the forests of Angat in Bulacan is particularly valued, although I do not

think that the better quality of Yacal of Tayabas is inferior to it. Elasticity, as shown by the elongation of the small rods experimented with: 0.0032 m.; breaks with a weight of 54.981 kilograms; weight in open air 14.790 grams, and specific gravity 0.925. Thus it will be seen that this is one of the heaviest and strongest woods in the Archipelago. It is to be regretted that in places of easy access, pieces of good dimensions are becoming scarce. S. VIDAL."

"Gives logs up to fifty feet long by twenty-two inches square. It is proof against white ants, has great strength and tenacity, and is much valued in Manila for house-building. FOREMAN."

"From twenty-four to forty feet long, twelve to eighteen inches square. Special sizes to fifty feet, and twenty to twenty-two inches square. Resists white ants, possesses great strength and tenacity, and is much valued in Manila for house-building and other purposes. BROWN."

"Branches black. Leaves alternate, lance-shaped, entire, smooth and stiff, with a long gland which breaks lengthwise, in each lateral vein of the under surface of the leaf. Petioles very short. Flowers axillary, drooping, globular and grow in compound racemes. Calyx cohesive at maturity, of one piece, divided in five parts, deeply cleft, round and fleshy; exterior ones covering the interior. Corolla of five parts divided nearly to the base, round and covering each other. Stamens more than thirty, fixed at the base of the ovary. Filaments short. Anthers of four angles, compressed, terminating in a hair. Ovary situated inside the flower before maturity, pyramidal with four sides. No style. Stigma appears to have two points. Nut crowned with five wing-like processes which are parts of the calyx; the larger (one and one-half inches in length) straight, and the other three small; the covering of the nucleus thin and leathery, enclosing a seed divided into five parts.

Trees larger than the body of a man, well known in Manila, and much prized for its hardness, and is much used for building roofs. Its flowers, which are smaller than those of the pea, when bruised emit an odor like that of the Lauan, and the wood does the same. It is a curious fact that the glands of the leaves when bruised appear like wounds or sores, from which circumstance I have so named the species. These trees do not produce resin. The stipules which crown the fruit in this species are greenish. P. BLANCO."

"TREE OF THE SECOND ORDER.—Grows spontaneously in the Island of Luzon; its trunk is well shaped; it grows fifteen to twenty meters high and 0.8 meters in diameter.

COLOR.—Earthy yellow.

TEXTURE.—Solid and fine; breaks in long splinters and gives a shaving very thin, compact and curled. It is much used for rafters in house-building and for beams in naval construction. SALVADOR CERON, p. 309."

CHAPTER IV.

THE ANAY OR WHITE ANT.

"The White Ant (termes), known here as Anay, is by far the most formidable insect in its destructive powers. It is also common in China. Here it eats through most woods (there are some rare exceptions, such as Molave, Ipil, Yacal, etc.) and indeed some persons assert, although I am unable to confirm it, that even the surface of iron is affected by these insects if left long enough where they are. If white ants earnestly take possession of the wood-work of a building not constructed of the finest timber, it is a hopeless case. I have seen deal-wood packing cases eaten away so far that they could not be lifted without falling to pieces.

Merchants' warehouses have had to be pulled down and rebuilt owing to the depredations of this insect, as even if the building itself were not in danger, no one would care to risk the storage of goods inside. The destruction caused by Anay is possibly exaggerated, but there is no doubt that many traders have lost considerable sums through having to realize, at any price, wares into which this insect had penetrated. FOREMAN, p. 390."

The following woods are not subject to attack by Anay: Dinglas, Ipil, Molave and Yacal.

Tindalo is attacked by Anay when there is no other wood in the vicinity.

Baticulin is attacked by Anay but is not damaged or destroyed, except such parts as are buried underground.

One hundred and twenty varieties of native woods and also woods from Borneo and America are being subjected to tests as to resistance to the white ant. These tests began December 1, 1900. A bulletin showing results will be issued this year.

TEST WITH THE WHITE ANT.

Mr. D. N. McChesney, master mechanic at the Depot Q. M. shops in Manila, found last February that his trunk (made of an American Spruce) had been invaded by white ants, and was almost entirely destroyed; the clothes contained in the trunk were also eaten. He placed the trunk on the ground and near it pieces of the following woods:

AMERICAN WOODS.	RESULT OF THIRTY DAYS' CONTACT WITH ANTS.
Oregon Pine	Entered and eaten; a mere matter of time for complete destruction.
Bull Pine, Spruce	Eaten more readily than Oregon Pine.
Hemlock	Not touched.
California Redwood, California White Cedar	Ants tried, but discontinued after a slight effort.
NATIVE WOODS.	
Molave	Ate a little of it, deepest hole about 1-4 inch.
Narra	Ate a little of it, deepest hole about 1-2 inch.
Painted wood	Ants worked under paint and ate the wood readily.

CHAPTER V.

STRENGTH AND WEIGHT OF WOODS.

List of hard woods arranged in order of their tensile and transverse strength.

TENSILE STRAIN.	TRANSVERSE STRAIN.	TENSILE STRAIN.	TRANSVERSE STRAIN.
1. Dungon	1. Molave	8. Acle	8. Banaba
2. Yacal	2. Camagon	9. Narra	9. Yacal
3. Ipil	3. Ipil	10. Tindalo	10. Mangachapuy
4. Mangachapuy	4. Acle	11. Molave	11. Lauan
5. Guijo	5. Dungon	12. Lauan	12. Guijo
6. Banaba	6. Tindalo	13. Cedar	13. Cedar
7. Camagon	7. Narra	14. Lanete	14. Lanete

FOREMAN, p. 372."

LIST OF WOODS.

Arranged in order of their elacticity, resistance and specific gravity.

SEBASTIAN VIDAL, p. 178."

ELASTICITY.	RESISTANCE.	SPECIFIC GRAVITY.
Calantas	Pagatpat	Ebano
Sulipa	Bansalagin	Camagon
Antipolo	Yacal	Yacal
Lanete	Culing-Manoc	Pagatpat
Anagap	Manicnic	Anusep
Baticulin	Ipil	Manicnic
Apiton	Molave	Dungon
Amuguis	Narra	Molave
Macasin	Cubi	Teca
Bancal	Guijo	Tindalo
Anubiong	Acle	Bolongita
Marang	Ebano	Camayuan
Calumpan	Camagon	Ipil
Malaruhat	Tindalo	Pasac
Calumpit	Calamansanay	Lanutan
Banaba	Calumpan	Banaba
Anusepmalatalan	Anusep	Cubi
Malatalan	Pino	Culing-Manoc
Manicnic	Palonapuy	Mangachapuy
Mayapis	Panguisan	Calumpang
Acle	Camayuan	Panguisan
Calamansanay	Dungon	Betis
Narra	Bolingita	Acle
Balao or Panao	Mangachapuy	Guijo
Molave	Betis	Uncasin
Guijo	Lanutan	Bansalaguin

LIST OF WOODS—CONTINUED.

ELASTICITY.	RESISTANCE.	SPECIFIC GRAVITY.
Palonapuy	Antipolo	Calumpit
Tindalo	Bancal	Malatlan
Cubi	Balao or Panao	Calamansanay
Yacal	Malatlan	Malaruhat
Camaynana	Nato	Narra
Santol	Banaba	Apiton
Bolongita	Tangile	Pino
Dungon	Palo-Maria	Tangile
Mangachapuy	Macasin	Antipolo
Nato	Malaruhat	Anubiong
Teca	Pasac	Malacadios
Malacadios	Mayapis	Nato
Panguisan	Lanete	Palo-Maria
Pino	Santol	Palonapuy
Betis	Anubiong	Calantas
Ipil	Malacadios	Amugius
Ebano	Anagup	Bancal
Camagon	Calumpit	Mayapis
Bansalagui	Apiton	Baticulin
Culing-Manoc	Baticulin	Lanete
Lanutan	Calantas	Anagap
Pagatpat	Marang	Santol
	Sulipa	Marang
		Sulipa
		Balao

WOODS THAT LAST WELL IN WATER.

Apiton	Acle
Banaba	Lauan (only for bancas)
Bancal	Mangachapuy
Batitinan	Molave
Betis	Panao-Balao
Calantas	Tanguile (cascos and bancas)
Dinglas (used largely in naval construction)	Teak
Dungon (especially durable in sea water)	Tindalo
Ipil	Urung

WOODS THAT LAST WELL IN THE GROUND, WITH CONCRETE NEXT TO WOOD.

Molave	Antipolo	Pasac
Dungon	Banuyo	Anubing
Ipil	Guisihan	Malaputat

"A VISIT TO THE PHILIPPINE ISLANDS."—BOWRING, 1876.

[Extract taken by him from a publication in 1858 by Col. Valdes.]

NAMES AND USES.	Weight of Cub. Decimeter.	Resistance. Per cub. cent. under pressure. With the grain vertical.	With the grain horizontal.	Tension or force of cohesion.	Max. elast. to be allowed in house construction.	Weight corresponding to this elasticity.	Force of elasticity of sq. cent.	Resistance to bending. Coefficient of fracture. Absolute strength.	Applicable force.
	Kilo.	Kilo.	Kilo.	Kilo.		Kilo.		Kilo.	Kilo.
ACLE.—Plentiful in the islands; used for edifices and cascoes	1.12	498	310	490	1/.1000 =0.001	49.0	49.130	140.0	14.00
ALINTATAO.—There are various kinds, and is used for making furniture in Luzon and Visayas	0.91	598	300	728	1/.1080 =0.0008	72.8	78.600	159.0	16.00
ALUPAG or ALOPAI.—Is used for supports and is plentiful	0.92	666	220	1242	1/.1443 =0.0307	124.2	179.280	178.2	17.82
AMBOGUES or AMOGUIS.—Is very much subject to attack by anay; is used for planks and boards for flooring	0.98	338	130	572	1/.1000 =0.001	57.2	36.362	165.5	16.55
ANINABLA or ANINAPLA.—Is used in building houses and boats; prized for its lightness and duration	0.59	340	146	193	1/.1335 =0.00075	49.3	65.560	146.37	14.64
ANONANG.—The leaves are covered with worms; the wood is used for drums and musical instruments	0.46	340	120	745	1/.1942 =0.0005	74.5	424.700	64.0	6.40
ANTIPOLO.—For canoes, floors and machines; it gives a gum which is used for bird-lime	0.41	286	70	564	1/.1390 =0.00072	56.4	78.608	115.0	11.50
BALIBAGO.—Twine and paper are made from the bark, and powder from the charcoal	0.46	616	200	1180	1/.924 =0.00108	118.0	108.000	165.0	16.50
BALETE.—The bruised roots are used to cure wounds	0.40	498	176	1345	1/.2008 =0.00049	134.5	270.000	89.1	8.91
BATICULIN.—White wood, for moulding and sculpture; very durable; abundant	0.42	186	100	215	1/.1818=0.00055	21.5	39.300	114.1	11.45
BANABA.—Resists well the action of the climate.	0.65	318	126	904	1/.1242=0.0008	90.4	112.300	166.0	16.60
BANCAL.—Strong and durable; it is used for furniture, flooring, boats and barrels	9.58	220	66	470	1/.148 =0.00071	47.0	65.500	763.7	7.64
BITOC.—Resists well heavy pressure	0.71	338	160	1010	1/.700 =0.00148	101.0	68.250	216.4	21.64
BOLONGUITA.—Strong for building purposes; plentiful	0.90	360	120	858	1/.917 =0.00109	85.8	78.600	153.0	15.30
CALAMANSANAY.—Used for flooring	0.86	533	130	892	1/.885 =0.00113	89.2	78.600	165.0	16.50
CALANTAS.—It is found in all parts of the Philippines and is used for canoes and fine boxes	0.40	470	60	517	1/.1515=0.00066	51.7	78.600	108.2	10.82
CALUMPIT.—For building; very strong wood	0.60 to 0.80	340	90	905	1/.87 =0.00115	90.5	78.600	1272.8	12.73
CAMAGON.—With beautiful grain and spots; polishes well and is used for fine furniture	0.92	558	340	752	1/.952 =0.00105	75.2	71.472	172.0	17.20
CAMAYUAN.—It is used for house building	0.94	434	340	493	1/.333 =0.00075	49.3	65.500	166.0	16.60
DONGON.—Fine wood for edifices; it is very plentiful	1.02	435	200	658	1/.926 =0.00108	65.8	60.468	140.0	14.00
EBANO.—Admits of a fine polish, and can be beautifully worked	1.91	688	470	1122	1/.8 =0.00106	112.2	97.400	114.0	11.40
GUIJO.—Is plentiful and very highly prized; is used for keels of vessels and carriage wheels	0.76	370	110	720	1/.833 =0.0012	72.0	60.000	190.1	19.00
LANETE.—Elastic and appropriate for furniture	0.55	336	120	462	1/.695 =0.00144	46.2	31.413	165.0	16.50
LAUAN.—Gives a resin used for incense; in former times used for vessels; plentiful	0.43	226	90	694	1/.1031=0.00097	69.4	71.712	76.4	7.64
MALACATBUN.—Very little used	0.63	146	60	306	1/.1724=0.00058	30.6	52.100		
MALACINTUD.—A strong wood; used for house-building	0.645	400	160	995	1/.793 =0.00126	99.5	78.600	140.0	14.00
MALAOUIDONDAO.—Makes strong futtock timbers in framing ships	0.78	350	116	1103	1/.714 =0.0014	110.3	78.600	165.4	16.54
MALATALISAY.—Elastic and flexible; for naval construction	0.50	300	60	498	1/.500 =0.002	49.8	25.230	101.82	10.18
MALARUHAT.—Solid texture; uses not mentioned	0.79	340	76	870	1/.1300=0.00077	87.0	112.300	191.0	19.10
MALATAPAY or MABOLO.—For furniture and edifices; it resembles ebony	0.78	500	290	740	1/.500 =0.002	74.0	39.300	146.4	14.64
MALABAGAT.—For edifices, especially for pieces used lengthwise	0.89	330	120	1430	1/.770 =0.0013	143.0	112.300	64.0	6.40
MANGA.—Variety of the manga of Cuba; on account of value of fruit, wood little used	0.58	380	166	910	1/.989 =0.001	91.0	90.000	16.4	1.64
MANGACHAPUY or GUISON DILAO.—For vessels and flooring of buildings	0.88	438	136	372	1/.1700=0.306	37.2	62.887	165.0	16.50

"A VISIT TO THE PHILIPPINE ISLANDS"—CONTINUED.

NAMES AND USES.	Weight of Cub. Decimeter.	Resistance. Per cub. cent. under pressure. With the grain vertical.	With the grain horizontal	Tension or force of cohesion.	Max. elast. to be allowed in house construction.	Weight corresponding to this elasticity.	Force of elasticity of sq. cent.	Resistance to bending. Coefficient of fracture. Absolute strength.	Applicable force.
	Kilo.	Kilo.	Kilo.	Kilo.		Kilo.		Kilo.	Kilo.
MOLAVE.—Called "Queen of Woods" by natives; applied to all uses; resists action of climate, lime and insects	0.95 to 1.02	600	290	1257	1/.625 =0.0016	125.5	78.600	254.6	25.460
NARRA or NAGA or ASANG.—For edifices, furniture, doors and windows	0.66	500	200	633	1/.833 =0.0012	63.3	52.400	127.3	12.730
PALO-MARIA or BITANHOL.—For masts, cross pieces, etc., of vessels	0.68	400	126	950	1/.926 =0.00109	95.0	87.350	134.0	13.400
PALMA-BRAVA or ANAJAO.—Strong and durable, especially in water; used for stakes	1.085	530	400	892	1/.884 =0.00113	89.2	78.600	153.0	15.300
PALOSAPIS.—A strong wood; used for canoes and bancos	0.50	440	146	870	1/.1243=0.0008	87.0	108.000	89.0	8.900
PANAO or BALAO or MALAPAJO.—For edifices and vessels; gives, upon incision, an odorous resin used by natives for illuminating purposes; used also for varnish	0.69	393	149	800	1/.1125=0.0009	80.0	90.000	101.8	10.180
PENCAPENCANAN.—Used generally for shoes and buoys	0.46	378	106	972	1/.111=0.0009	97.2	108.000	134.0	13.400
POTOTAN or BACAO.—For stakes on account of its resistance to action of water	0.69	420	146	1.780	1/.1517=0.00065	178.0	270.000	153.0	15.300
SAMPALOC or TAMARINDO.—For tools and other purposes and for edifices	0.62	320	90	846	1/.934 =0.00107	84.6	78.600	121.0	12.100
SANTOL.—Used for posts and pillars; not very plentiful	0.46	630	...	810	1/.1823=0.0007	81.0	108.000	153.0	15.300
TANGUILI.—For edifices	0.57	300	100	693	1/.1313=0.00096	69.3	71.462	114.56	11.456
TANGAN.—For window frames, joists, etc	0.65	330	60	658	1/.756 =0.00135	88.5	65.500	114.56	11.456
TINDALO.—For furniture; emits an agreeable smell	0.89	450	106	470	1/.1042=0.00096	47.0	49.130	165.5	16.550
YACAL.—For ship-building, rafters and joists	1.105	459	200	1.174	1/.833 =0.0012	117.4	98.260	191.0	19.100
IPIL.—Used generally for house-building; is plentiful in Luzon	1.035	434	300	563	1/.714 =0.0014	56.3	39.300	153.0	15.300

	COHESION. Limit of elast.	Rupture.	PRESSURE. Limit of elast.	Absolute resist.	FLEXION. Limit of elast.	Resistance.	TORSION. Limit of elast.	Resistance.	RESISTANCE TO CUTTING. Perpend. to fib.	Parallel to fib.
Acle	183	380	218	311	216	482	34	62	286	71
Antipolo	180	377	216	313	219	478	33	60	281	68
Amuguis	172	353	211	308	212	450	32	57	270	62
Apiton	166	335	208	300	207	441	30	52	261	60
Anuvion	180	387	228	344	282	481	35	54	200	65
Bansalagui	310	552	235	327	312	542	44	85	376	72
Bancal	280	383	218	245	213	418	32	74	198	73
Betis or Azaola	339	657	253	385	388	682	52	101	393	78
Bansi	230	301	210	284	275	113	34	78	180	72
Banaba (red)	346	670	273	400	338	698	52	103	387	79
Camunin	357	687	275	392	343	687	48	97	396	77
Cedro or Calantas	172	513	212	350	130	300	30	52	215	33
Camagon	368	700	247	385	327	691	49	97	382	77
Calamansanay	304	483	222	301	257	513	31	77	208	70
Dungon	327	394	377	398	192	603	67	82	384	79
Dinglas	343	395	383	415	187	690	69	83	100	88
Ebano mulato	315	695	380	397	215	685	69	83	403	92
Guijo	320	380	374	427	175	622	63	80	298	82
Lanete	253	240	111	233	175	412	28	71	238	57
Lanutan	320	388	345	352	187	613	90	81	385	87
Malarujat	287	315	371	312	152	527	59	78	346	77
Malatapay	318	402	395	408	203	682	71	81	390	89
Molave	282	318	223	343	225	568	60	79	311	77
Manienie	322	680	397	398	667	680	77	86	410	90
Mangachapuy	281	312	300	337	153	598	65	82	312	79
Macasin	292	325	327	343	155	568	60	77	341	69
Mayapis	213	454	221	395	137	309	33	50	283	44

	TRACTION.		COMPRESSION.		FLEXION.		TORSION.		RESISTANCE TO CUTTING.	
	Limit of elast.	Rupture.	Limit of elast.	Absolute resist.	Limit of elast.	Resistance.	Limit of elast.	Resistance.	Perpend. to fib.	Parallel to fib.
Naria (red)	245	313	217	313	295	500	38	82	320	75
Pagatpat	200	688	248	450	183	476	35	58	298	33
Pasac	171	513	200	374	138	303	32	52	208	32
Supa	288	321	343	373	258	532	35	78	229	72
Solipa	125	238	188	218	282	329	33	51	172	44
Teca	351	638	243	368	288	590	43	96	392	83
Tindaloor Batalayon	324	652	233	351	272	587	13	95	350	78
Tangile	285	348	313	317	250	584	48	78	300	75
Yacal	365	672	245	372	323	663	52	92	371	76
Ypil	193	638	241	357	128	382	34	53	295	35
Yamagua	100	113	198	283	71	200	23	51	201	31

OTHER WOODS MENTIONED.

Acacia of 3 points.	Balonguita.	Ebano carbonero.	Malabongo.	Pino carrasco.	Roble pedunculado.
Abeto.	Baldomero.	Frésno.	Malacadins.	Pino silvestre.	Roble melojo.
Aliso.	Carpe.	Granadillo.	Malatalisais.	Pino de Escocia.	Raspa-lengua.
Alerce of Alpes.	Cuvil.	Guayacan.	Mangle (red).	Pino pinonero.	Sauce.
Algarrobo.	Caoba.	Guairaje.	Maboa de la Costa.	Pino de la Florida.	Serbal.
Abedul.	Cucuyo.	Guayabo.	Monte-Cristo.	Pino de America.	Sabucao.
Acebuche.	Chicharron.	Haya.	Moruro.	Pino negro.	Sabicu.
Alcornoque.	Culimg-manog.	Jucaro black.	Maboa del interior.	Pino marítimo.	Santol.
Acana.	Cerezo.	Jaimiqui.	Manianita.	Pino or palo pino.	Sigua.
Alerce of Canada.	Castaño.	Jaguey.	Nogal.	Pino de Canarias.	Tamarindo or Sampaloc.
Aiti or Iti.	Cuaba.	Jigui de la ley.	Nato.	Palma real.	Tortuga.
Almez.	Caimito.	Jiba.	Olmo.	Palma brava.	Tilo.
Alamo (white).	Carne de doncella.	Jaboncillo.	Palo mulato.	Palo apuy.	Yana cuaba.
Brasil (red).	Cuero duro.	Leviza.	Palo diablo.	Quiebra hacha.	Yaiti.
Brasil sappan.	Dagame.	Mamey.	Pinabete.	Quejigo.	Yana.
Balsamo.	Enebro.	Majagua.	Pinsapo.	Roble comun.	Yua.
Baria or ataje.	Encina.	Malarigat.	Pino salgareño.	Roble albar.	

SALVADOR CERON, Insp. Gen. de Montes, 1889-1893.

CHAPTER VI.

USES OF WOODS.

WOODS MOST PREFERRED IN NAVAL AND ORDINARY CONSTRUCTION.

The woods most esteemed at present for export are the following:

In naval construction a wood should have, in addition to close and compact weight, a certain amount of elasticity and be easily worked, qualities which make the Teak of Malabar so valuable.

Lloyd in his classification of woods has placed the Molave, Dungon and Betis in the highest class.

The following are preferred in China:

Futtock timbers (frames of vessels), Molave and other similar woods. Futtock timbers should have a minimum length of thirty feet.

Stems, sternposts and stanchions: Molave, Dungon and analogous woods.

Beams and planks: Mangachapuy, Batitinan, Banaba and others analogous and having close and compact pores and a certain elasticity and buoyancy.

Keels: Betis and Dungon.

Decks: The Chinese prefer the North American Pine. This affects very much the sale of Malasinoro, Lauan rojo and other similar woods. The Pine

from Puget Sound, Oregon, and other parts of the United States and also the Peun of Singapore, which is our Sambualan, is sold in Shanghai free of duty at .035 to .050 cents (Mex.) per square superficial foot, and one inch thick. At these prices it is impossible for us at present to compete in deck timbers.

In ordinary construction the woods generally used are Bansalaguin, Macasin, Calumpit, Guijo, Pagatpat, Malatumbaga, Supa (sold under the name of Ipil), Ipil (known as Black Ipil), Malasinoro (passed as Mangachapuy), Mangachapuy (passed in China as White Molave), Acle (very similar to the Teak, Jungle Teak of Singapore and Borneo), Maladungon, Balaon and Apiton Rojo, these three being prized as piles, Mulamgat, Malauin Aso (passed as Molave), Yacal (called there Gray Molave), Bulobog (sold as Apitong), Sandano (passed as Molave), Bancalanag, Duca, Calamansanay and some others.

From the above it will be seen that exporters pass off woods of an inferior quality for those of a higher grade, thus discrediting the superior woods. Notwithstanding this the Chinese never buy wood by invoice and attach little importance to names. Their methods of buying are very crude, the principal factors of importance to them are, that the wood does not float, and that it is of a dark color, when as a matter of fact many of the Filipino woods of the first-class, when well seasoned, float; the question of color is of little or no importance. Their methods of buying is by inspection, cutting the wood with an axe and examining it; the woods which they prefer are the Molave, Narra, Bansalaguin (highly prized), Yacal, Dungon, Supa, Tindalo, Betis, Mangachapuy, Camagon, Acle and Ipil. There are others which have little or no value in the Philippines, being subject to attacks by the anay, woods which should find a ready sale and be well appreciated in Northern China and Japan, where this destroyer, Termis Dives, is unknown.

DOMINGO VIDAL, p. 202."

LIST OF THE PRINCIPAL WOODS OF THE PHILIPPINES.

ARRANGED ACCORDING TO USES.

(Sebastian Vidal, pp. 179-180.)

FOR CABINET MAKING.

For fine furniture.—Ebano, Camagon, Bolongita, Tindalo, Narra, Malatapuy, Alintatao, Camuning.

For ordinary furniture.—Lanete, Narra blanca, Lanutan, Malaruhat, Antipolo.

FOR NAVAL CONSTRUCTION.

Keels, stern-posts.—Yacal, Betis, Dungon, Ipil.

Futtock timbers, sterns, knees.—Molave.

Outside construction, beams.—Banaba.

Beams, masts.—Guijo.

Keelsons, sleepers.—Batitinan.

Waterways, decks.—Mangachapuy.

Superstructure, inside divisions.—Amuguis of Mariveles.

Futtock timbers, masts.—Palo-Maria.

The frigate "Esperanza," built at Cavite Arsenal in 1834, and which still has her woodwork in perfect condition, is testimony of the great superiority of the Philippine woods in ship building.

CONSTRUCTION OF CANOES (BANCAS).

Tangile, Lanuan, Malaanonang, Balao, Mayapis, and many others less used. Quick grower.

FOR HOUSE CONSTRUCTION.

Molave.—Pillars, joists and window and door and other frames.

Ipil.—Same uses.

Supa, Balao.—Substitutes for Ipil, but is inferior.

Dungon.—Pillars, sills, dormers, etc., especially used for pieces required to resist much pressure, and which do not need to be finely finished, for it is not easily worked.

Banaba.—It is employed in many different kinds of pieces. Moisture affects it very slightly.

Yacal.—Excellent for rafters and other pieces. Those of large dimensions are becoming scarce; nevertheless, there are some twelve meters long by 0.20 to 0.25 meters square.

Amuguis, Bataculin, Malatumbaga.—Generally sawed into planks and used for partitions, ceilings, etc.

Calantas.—For special line of boxes for superior class of cigars.

FOR ORDINARY BOXES.

Tangile, Mayapis, Malaanonang, and many others of many classes, easy to saw and very plentiful.

1. Curved pieces fifteen to twenty meters long, 0.23 to 0.30 wide and 0.45 thick.
2. Of short duration; did not last ten years in the canoneras.

S. VIDAL."

Many of the Philippine hard woods considered of no value here on account of the insects, climate, etc., would find favor in America where such enemies would not be encountered. Many such woods are strong, of fine grain, take a high polish and are excellent material for fine furniture.

USES OF VARIOUS CLASSES OF TIMBER.

Pillars or harigues.—Molave, Ipil and Anobin; the latter must be thoroughly free of sap or white wood, which is attacked by white ants. Acle also is used for harigues.

Beams on the pillars to receive rafters.—Dungon and Yacal, which are notable for resisting great transverse pressure, and attacks of white ants.

Joists, rafters, etc.—Yacal, Banaba, Batitinan, Macasin, Ipil and Dungon; latter two kinds are rather heavy for roof work.

Flooring.—Banaba, Guijo, Mangachapuy, Macasin, Tindalo, Supa and Calamansanay.

Partitions.—Banaba, Bancal, Guijo, Calantas, Mangachapuy, etc.

Tabla din-din or outside planks of houses.—Molave, Narra, Acle.

Window frames.—Molave.

Doors.—Narra, Cedar.

Ceiling.—(Cedar Calantas) Baticulin, Anagap, Mangachapuy.

Rafters, joists, flooring.—Aranga.

Laguimanoc, 10th December, 1888.
(Signed) H. G. Brown."

CHAPTER VII.

Gutta-percha in Mindanao.

"The Father Missionaries of the Company of Jesus have just written the Father Professor of Natural History in the Municipal Atheneum of Manila, giving an interesting account of the new industry of procuring Gutta-percha in that Island.

Father Bofill under date of December 23d, writes: 'During the past three months, the Tirurayes (Tamontaca), near Cottabato, have been actively engaged in extracting in the forests Fequet, a species of gum, from the Fefedus tree. They fell the tree and make perpendicular cuts along the trunk, and collect in large leaves the juice which exudes.

At first they sold this gum to the Chinamen at three and four dollars a pico, but now they get thirty dollars for it; it is really worth seventy dollars in Europe.

I advise you of this that you may know what a useful product this is, and the facility with which it can be extracted; it is a great pity that the trees are destroyed.

Many people are engaged in this industry and they are now extracting the gum from the trees in the forests of Dulanganas.

It is also said to exist in the island of Bongao.'

Father Sancho adds in a letter from Zamboanga, dated December 26th: 'It has just come to my knowledge that my parishioners of Santa Maria have discovered a new gum, so valuable as to be worth twenty-five dollars a pico. I will try to procure a good sample and send it to you.'

The word Gutta-percha is of Malay origin and signifies, gutt, gum, percha, Sumatra; *i. e.*, gum of Sumatra.

It belongs to the Sapotaceæ and to the genus Isonandra.

Mr. Robert Wright in his 'Illustrations of Indian Botany,' says, in Vol. II., XCVIII, Sapotaceæ: 'There are two species of Isonandra; one grows in the forests, the other in the foothills of the mountains. Gutta-percha is the most highly prized of all, among the products of the Sapotaceæ.

It is extracted from the Isonandra Percha, Hooker.

This genus originated from two plants in my collection; afterwards three more were discovered, all of India, the properties of which have not yet been investigated.

The Isonandra of the Indias differs from that of the Filipinas in that the flowers of the Filipinas are hexamerous while those of India, tetramerous; in other respects these two species are so analogous as to appear to be species of the same genus; yet there is a difference in their properties as there is in their flowers.'

REVISTA CATOLICA DE FILIPINAS, Wednesday, February 1, 1893."

GUM ELASTIC.

"Gum" elastic is extracted from trees belonging to the family of the Urticaceæ principally the Ficus elastica and is so well known that there are many growing in the gardens of Manila. It is also extracted from the Ficus radicans and from two others species of ficus which grow in the forests of the Philippines; also from various trees of the genus Artocarpus.

The Gutta-percha of the commerce of Manila, comes from the trees of the family Sapotaceæ of the genus Sideroxilon, Dichopsis and principally Palaquium.

The gutta-percha coming from Mindanao is sometimes adulterated, being mixed with the juice of the Alstonia and other trees which have a milky juice but which is not of the consistency of gutta-percha. R. GARCIA."

TREE SPECIES OF THE SAPOTACEÆ AND URTICACEÆ FAMILIES FOUND IN THE PHILIPPINE ISLANDS.

Lucuma mammosa Gærtn., Chico mamey.
Sideroxilon attenuatum, A. DC.
Sideroxilon ferrugineum, Hook.
Sideroxilon parvifolium, F. Vill.
Sideroxilon Duclitan, Blanco, Duclitan.
Sideroxilon nitidum, Bl.
Sideroxilon Balitbitan, Blanco.
Achras Sapota, Linn., Chico.
Palaquium latifolium, Blanco, Palacpalac.
Palaquium oleiferum, Blanco, Alacap.
Palaquium luzoniense, Vid., Bagalangit.
Palaquium lanceolatum, Blanco, Bagalangit.
Palaquium cuneatum, Vid.
Isonandra Gutta, Hook, Malaputat
Chrysophyllum grandifolium, Steud.
Dichopsis polyantha, Wall.
Dichopsis cuneata, Bl.
Bassia butyracea, Roxb.
Azaola Betis, Blanco, Betis.
Mimusops Elengi, L., Cabiqui.
Mimusops parvifolia, Br., Bansalaguin.
Mimusops Manilkara, G. Don.
Artocarpus incisa, L. f., Antipolo.
Artocarpus Rima, Blanco, Rima.
Artocarpus elastica, Reinw., Tugup.
Artocarpus Camansi, Blanco, Camangsi.
Artocarpus odoratissima, Blanco, Loloi.
Artocarpus polyphema, Pers., Marang.
Artocarpus integrifolia, Willd., Nangca.
Artocarpus Cumingiana, Trec, Cubi.
Artocarpus ovata, Blanco, Anubing.
Artocarpus nitida, Trec., Bayuco.
Ficus indica, Linn., Baliti.
Ficus clusioides, Miq., Balete.
Ficus benjamina, Linn., Baliti.
Ficus microcarpa, Linn. f., Bigas.
Ficus parvifolia, Miq., Baliti.
Ficus concinna, Miq, Nonoc.
Ficus hæmatocarpa, Bl., Taglicot.
Ficus pungens, Reinw., Agos-os.
Ficus hirta, Vahl, Biri.
Ficus heterophylla, L. f., As-is or Is-is.
Ficus polycarpa, Roxb.
Ficus radicans, var. angulosa, Miq., Taquines.
Ficus hederacea, Roxb., Haguimit.
Ficus subracemosa, Bl., Hauili.
Ficus racemifera, Roxb., Tabuyog.
Ficus glomerata, Willd., Aymit.
Ficus cuneata, Miq., Dungarug.
Ficus leucopleura, Bl., Lagnob.
Ficus radiata, Dene, Lagnob.
Ficus pseudo-palma, Blanco, Sulamiog.
Ficus pilosa, Reinw., Taquines.
Ficus nuda, Miq.
Ficus callophylla, Bl.
Ficus conocarpa, Miq.

CHAPTER VIII.

AUTHORITIES CITED.

FATHER JUAN JOSÉ DELGADO (JESUIT).

Was born in Cadiz, Spain. He went to Mexico and from there to the Philippines in the year of 1711. He filled various positions in Manila and also in Samar; and in 1719 was Superior of the mission of Palapag; was assistant at Taytay and

Guiguan. He was transferred to Carigara, Leite, as Rector and Superior, also filled missions in Inabangan and Talibon, Bohol.

He commenced to write his book in Guiguan in 1751, after a residence of forty years in the Philippines. He was studious, observant, and an excellent critic.

He was a very pious, enthusiastic and patriotic man. He showed great love for his spiritual followers, and was a zealous advocate for honest administration of the affairs of the islands, and a valiant defender of the rights of the Indians.

It is not known when he died.

PADRE FR. MANUEL BLANCO

Was born on the 24th of November, 1778, in Navianos, Province of Zamora, Spain.

In 1794, he entered as a novice in the College of the "Augustine Friars" (Calzado) at Valladolid, taking the vows of a religious the following year.

Having finished his studies with distinguished honors, he came to the Philippines in 1805. Upon arrival at Manila he was sent to Angat in Bulacan to study the Tagal language. He afterwards filled many clerical positions, and made many trips in a religious capacity to the various islands of the Archipelago, devoting his spare time to the study of the country and its products.

While Rector of the town of Angat, Bulacan, he made a botanical study of the luxuriant vegetation of the neighboring mountains with the assistance of the "Sistema Vegetabilium" by (Linneo), the works of the celebrated Jussieu, and the manuscripts of some prelates. He then commenced to write his immortal work "Flora de Filipinas" which he from modesty calls "the daughter of simple curiosity." This work contains a scientific description of more than 1200 species (according to Linneo) with full notes on their properties and uses.

Such was the modesty of the author that only at the urgent solicitations of many distinguished persons including the Queen herself, through the Captain General, would he consent to publish his work. He also published "Topographical Letters," published in 1834, descriptive of the provinces over which he had spiritual charge. He translated from the French to Tagal a work entitled "Domestic Medicine, by Tissot," with so many notes of his own, that it should be called a new work, rather than a translation. It is written in elegant Tagal, and merits the attention of scholars. He also wrote some small religious works in Tagal.

He died in Manila, April 1, 1845.

SEBASTIAN VIDAL.

Was born in Barcelona, of well to do parents.

He was educated in the School of Villaviciosa de Odon, receiving the title of Engineer of the second class, August 16, 1865; was promoted to Engineer of the

first class 1866; in February, 1871, to Engineer Chief of the second class, and in January, 1882, to Engineer Chief of the first class in the Peninsula.

He finished his education in Germany. Even before he had finished his studies he was thanked in R. O. for services on the commission for the investigation of the inundations of the Júcar.

Upon his return to Spain he was appointed a Professor in the School of Forestry, and in 1871 Inspector General of the Forestry Department in the Philippines. He was chief of a commission appointed to study the Flora of the Philippines, and was also placed in charge of the Botanical Garden.

He wrote the following works: "Studies upon the Forestry of the Philippines," Madrid, 1874; "Notes upon the Forests and Agriculture of North America;" "Catalogue of the Sylvan and cultivated Ligneous Plants observed in the Province of Manila," Madrid, 1880; "Review of the Flora of the Philippine Archipelago," Manila, 1883; "Synopsis of the Families and Genera of the Ligneous Plants of the Philippines with an Atlas of one hundred engravings," Manila, 1883; "Phanerogamæ Cumingianæ Philippinarum," Manila, 1885; "Revision of Vascular Plants of the Philippines," 1886.

The merits of these works are recognized by all botanists. He discovered more than 100 new species, not treated of in the works of other authors. He filled various high commissions representing Spain in congresses and expositions; notably the Exposition of Philadelphia and the Exposition of Philippine products; celebrated in Madrid in the year 1887.

He died in Manila, July 1889, while Inspector General de Montes.

The Catalan Colony with the personnel of the Forestry Department subscribed to a fund to erect a monument to perpetuate his memory in the Philippines, in whose service he dedicated his life work.

This monument was erected in the Botanical Gardens, where it now stands.

DON DOMINGO VIDAL, ENGINEER CHIEF IN THE FORESTRY SERVICE.

Was born in Barcelona, Spain. He and his brother Don Sebastian studied in the School of Forestry Engineers. He filled various positions in different provinces of Spain, and came to the Philippines in the year 1877 as second chief of the Inspección General de Montes.

He published a work on forestry, wrote scientific and administrative articles for the papers, and was the editor of the third edition of the "Flora Agustinia."

His book was finished by Don Sebastian Vidal.

Prostrated from over-work he returned to Spain where he died shortly afterwards.

Mr. Henry Brown, an Englishman, succeeded his brother in the timber business in Laguimanoc (Tayabas) about 1870. He formed a lumber company about 1872; this company failed a few years before the American occupation.

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